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LAND — AIR — WATER

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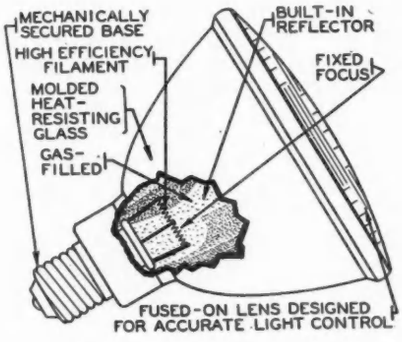
Automotive Industries



MAZDA GOES FUNCTIONAL

The lamps shown above were designed for use in industry, showrooms, studios, and for solving many outdoor lighting problems.

Upper photograph shows one of the new spot lamps as a completely assembled unit, including sealed-in parabolic reflector, fused-on spot lens, and mechanically secured base.

The cut-away view illustrates the points of the same lamp, most of them introduced for the first time in the new design. Additional descriptive details are given in the article which begins below.

New Lamp

Designed for Industrial Uses In Many Fields

A revolutionary lamp design was announced this week for industrial applications by the General Electric Company.

The new lamp is a hermetically sealed unit, with the reflector included in the shell of heat-resistant glass. Its life exceeds that of conventional lamps; the filament remains permanently in accurate focus; and the reflecting surface is permanently protected from deterioration.

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News of the Industry

STEEL PRICES SHAVED

● The U. S. Steel Corp. and Bethlehem Steel Co. announced late Tuesday that they were selling hot and cold rolled sheets to automobile manufacturers at four dollars a ton under the "official' price scale. The reduction, said to make a difference of about a dollar in the cost of manufacturing a single automobile, was reported to have been made to meet competitive conditions.

Some companies have been reported selling steel to automobile makers below the prevailing prices for two months or more and with buying now being renewed on fairly large scale the larger steel companies are believed to have felt they must meet that competitive situation. The reduction brings Detroit delivered prices to $2.05 a hundredweight for hot rolled sheets, and $3.10 on cold rolled, each down about 20 cents from the old price.

Other current aspects of the automotive metal market will be found on page 459 of this issue.

● Twenty-five thousand tons of steel have been ordered by the Ford Motor Co., the tonnage being split up among a number of producers. It is estimated that this order plus Ford's own steel output will be sufficient for 50,000 cars.

THEY'RE BUILDING AGAIN

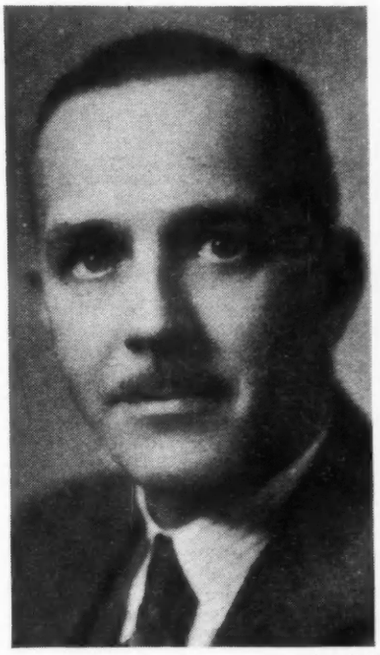
● Buick Motor Division, General Motors Corp., has retained the services of Albert Kahn, Inc., architect and engineer, for the design of a two-story addition at Flint, Mich.

● Approximately 75,000 sq. ft. of floor space is being added by Allis-Chalmers Co., Milwaukee, to its branch plant at La Porte, Ind. Cost with equipment is estimated to be in excess of $175,000.

● Wright Aeronautical Corp., plans a two-story addition to its plant in Paterson, N. J. One-hundred thousand square feet of floor space will be added for assembly and other operations at a cost of approximately $125,000. Albert Kahn is architect and engineer.

● Late in 1938 work is scheduled to begin on a $1,000,000 plant for General Motors Holdens, Ltd., at Sydney, New South Wales, Australia. The new factory will be used for assembly of automobiles and include a parts division.

Production summary for this week will be found on page 462.



Associated

IRVING H. TAYLOR

. . . a native of Detroit, has been appointed chief of the Automotive-Aeronautics Trade division, Bureau of Foreign and Domestic Commerce, Department of Commerce. Mr. Taylor entered the service of the Bureau of Foreign and Domestic Commerce in 1925 and was assigned to duty in the automotive division. He resigned in 1928 and returned in 1930 as Trade Commissioner in the Milan, Italy, office. Following a period of service in the Bureau s Vienna office, he was recalled to Washington and named acting chief of the Automotive-Aeronautics division. A story on the activities of this division will be found on page 461 of this issue.

Production

Estimated 40,000 Units This Week Reflection of Rising Demand

In response to a demonstrated demand for new automobiles in many parts of the country, as reported by dealers and factory field organizations, car and truck production for the week ending Oct. 15 will show another encouraging increase over the preceding week.

A preliminary check of factory schedules for the week indicated that the industry will run close to 40,000

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News of the Industry

HOW'S BUSINESS?

● Bolstered by a 25 per cent increase in automobile assemblies over the previous week, the weekly index of business activity of the Administrative and Research Corp., New York, on Oct. 1 reached its best level since January. The weighted composite index stood at 70.3 for the week, compared with 68.2 for the previous week. Eight factors are weighted in the index, with the automobile industry's weekly performance assigned a weight-factor of 6 points out of a total of forty. Base of the index is 1926 equals 100.

● Because of a substantial increase in its volume of automotive battery business, USL Battery Corp. is devoting the entire facilities of its Niagara Falls factory to the manufacture of automotive, radio and farm lighting batteries, according to a statement by H. A. Harvey, USL vice-president.

Facilities formerly devoted to the manufacture of batteries for railroad, industrial and utility service are being utilized for automobile battery manufacture and the company's industrial battery division is being discontinued immediately.

Arrangements have been made with Gould Storage Battery Corp., Depew, N. Y., to take over the USL Power Battery Department.

● In the wake of New England's hurricane tragedy millions of dollars are being spent to repair damages and replace property swept to destruction by high wind and tidal waves. Thousands of automobiles were completely removed from the map or severely damaged. It will mean increased demand for new cars and automobile parts, more business for repair shops. Tremendous sums must also be expended to repair or replace highways and bridges which succumbed to the terrific force of the worst storm in New England in 100 years. For road materials only, it is estimated that New York and the New England States will expend about $25,000,000.

● Alert producers in the oil industry are cagily watching activities in the southern Illinois field, now running an output of approximately 77,000 bbl. daily. Although this seems an insignificant amount when compared to the national production of 3,240,000 bbl. daily, the point is that Illinois owners are not curbed by state regulation, can tap as much as they can sell. This fact coupled with Illinois' proximity to important refining and consuming centers, has stimulated activities to fever pitch.

Pure Oil, pioneer in the Illinois field, is out in front with a daily of 21,000 bbl., with Texas Co. closest rival.

● Apparently untouched by the blight of depression, industries utilizing electrical energy for the production of chemicals and metals are revealed in a recent report to be continuously surpassing previous annual activity records. In 1933 these industries topped their "Good old days of '29" by seven per cent. Forecasters say that they probably will expand 33 per cent in the next five years.

Leaders in the electro-industry produce metals such as aluminum, copper, ferro-alloys, chlorine, and caustic soda. Smaller companies produce zinc, calcium, carbide, synthetic nitrogen, carbon, and graphite, abrasives, magnesium, and potash. All use processes which essentially depend on electrical energy.

The document reporting these details was issued recently and resulted from work begun as part of the National Power Survey created by the Federal Power Commission about five years ago.

MORE DIESELS ON RAILS

● Edward G. Budd Mfg. Co., Philadelphia, has received an order for another stainless steel train from the Burlington Lines. This is No. 9 for Burlington and will feature: sound-proofed Diesel-generator sets under each car to supply electric energy for heat, light, and air-conditioning; indirect fluorescent lighting; and a disk-type brake to replace the conventional shoe. Electro-Motive Corp. is building the power unit.

● Nine new 1800-hp. Diesel-electric locomotives, now being completed by Electro-Motive Corp., La Grange, Ill. will begin operating Dec. 16 in the Seaboard Railway's fleet of Florida and Mid-South trains. Three of the new power units will be coupled together to pull Seaboard's Orange Blossom Specials.

The Milwaukee Road recently put its 1939 model Hiawatha on the seven-hour Chicago-Minneapolis run. Otto Kuhler, New York designer specializing in transportation, designed the streamliner. The American Locomotive Works built the engine, and the train was fabricated in Milwaukee's shops.

● "It is necessary to develop more power per unit (on Diesel passenger locomotives) than is given at present in case Diesel locomotives would be used on intermediate speed passenger trains with heavy tonnage in mountain service. If this can be done without increasing the present weight of Diesel locomotives, indications are that Diesels can make a place for themselves in all types of passenger service, providing that sufficient mileage can be made to offset the unfavorable initial investment cost." This was a reflection of E. E. Chapman, mechanical assistant, A. T. & S. F. Railway, at the Metropolitan Section meeting of the Society of Automotive Engineers in New York on Thursday.

The meeting on Diesels and Diesel-electric streamlined trains inaugurated the 1938-39 series of technical sessions of the Metropolitan Section. Other speakers were O. Jabelmann, assistant to the president and in charge of research for the Union Pacific R. R., W. H. Mussey of the Pullman Standard Car Mfg. Co., and E. J. W. Ragsdale.

TRUCKS AND TIRES FOR WPA

● Motor trucks valued at $1,940,000 were purchased for projects of the Works Progress Administration during its first three years through June 30, 1938, according to statistics compiled from U. S. Treasury and WPA sources. In addition, purchases were made of tires and rubber goods amounting to $1,766,000.

All buying for Federal account was done through the Procurement Division of the United States Treasury Department after open competitive bidding.

These figures are small in comparison to the value of rentals and services supplied to WPA projects by trucks and vans which is estimated to have been about $235,000,000.

Firestone Finance

$50,000,000 Debenture Issue Planned by Rubber Company

Firestone Tire & Rubber Co., of Akron, has registered with the Securities and Exchange Commission a $50,000,000 issue of 10-year debentures which, when passed upon, will represent the sole funded debt of the company and its subsidiaries. Firestone officials report net profits for the nine months ended July 31, 1938, of $4,222,375 after interest, depreciation, federal taxes and all allowances and other charges. Sales for the period were $104,347,823, a decrease of 10 per cent from $115,960,435 for a like period of last year.

Net proceeds from the sale of the $50,000,000 debentures will be used as follows: $5,555,000 to retire bank loans incurred for the retirement on Sept. 1 of all the 5 per cent bonds of the Firestone Tire & Rubber Co.; $7,272,000 for retirement on March 1, 1939, of all the 5 per cent bonds of the Firestone Cotton Mills; and the remainder for retirement of bank loans. On July 31, Firestone's bank loans amounted to $41,491,317, as compared with $27,500,000 on Oct. 31, 1937.

The company's balance sheet as of July 31, 1938, shows cash of $13,236,242, inventories of $48,336,292, current assets of $89,733,029 and current liabilities of $49,658,536, exclusive of long-term debt called for retirement. On Oct. 31, 1937, cash amounted to $10,714,036, inventories were $52,314,227, current assets were $88,332,892 and current liabilities were $41,800,088.

The balance sheet showed that Firestone made large plant expenditures this year. The gross valuation of its plants and equipment on July 31 was $108,020,444, as compared with $99,187,861 on Oct. 31, 1937. The net property account, after depreciation, was $74,929,991 on July 31, as against $68,508,213 on Oct. 31, 1937.

Firestone's largest recent plant expansion project has been the construction of a tire and mechanical goods plant at Memphis, on which $10,600,000 has been expended. The floor area of the new unit is 43 per cent of that of the company's two main Akron plants.

CELEBRATION Dr. J. S. Thomas, president of the Chrysler Engineering Institute, as he appeared speaking at the dinner celebrating completion of the fifty-thousandth turret lathe built by Warner & Swasey Co. (See AUTOMOTIVE INDUSTRIES, Oct. 8, page 429.) Said Dr. Thomas, "Without the materialistic culture which has produced machines like this great lathe we never could have carried along the idealistic culture which has given us our Shakespeares, our DaVincis and our Aristotles." Seated with Dr. Thomas at the dinner were J. C. Ward, Jr., assistant general manager of Pratt & Whitney Aircraft Co., to whom the lathe was shipped; Charles J. Stilwell, vice-president of Warner & Swasey Co.; and Charles Deeds, vice-president and general manager of Pratt & Whitney Aircraft Co.

More Speed at Bonneville Salt Bed

Ab Jenkins Plans November Attempt at Eyston's Record; Campbell May Come to U. S. for Speedboat Runs

Britain's ten-year monopoly of super-speed records is destined for an early end . . . or America's Ab Jenkins has been sitting up nights with the wrong specifications.

A year ago—when Capt. George Eyston zoomed over Utah's Bonneville Saltbed at 311.42 m.p.h. to dethrone his fellow countryman, Sir Malcolm Campbell—Jenkins began definite preparations for an assault on the mile straightaway mark.

Adhering to the contention of outstanding American engineers that monster cars are not necessary for the fastest land speeds man ever has driven, Jenkins has prepared a car smaller than Eyston's "Thunderbolt" and John Cobb's "Railton."

And, a far cry from the British cars, the Jenkins "Mormon Meteor" —this one, "the Third"—follows conventional lines as closely as a super-speed car dares.

Two 12-cylinder Curtiss airplane engines, each of 1600 cu. in. displacement, will drive the 3-ton racer over the sleek salt surface. The engines will develop a total of 2400 h.p. Eyston's "Thunderbolt" is rated at 3250 h.p.

Jenkins will depend on the conventional four wheels for traction, thus falling in line with Cobb's design. Eyston's "Thunderbolt" has eight wheels, two pairs in front and dual wheels on the rear. Sir Malcolm Campbell's 1935 "Bluebird" ran on six wheels, one pair in front and duals on the rear.

What his attempt at super-speed is going to cost, Jenkins frankly admits will remain pretty much of an uncertainty until the auditors tally his books at some later date.

"The cost," Jenkins has so far determined, "will be certainly not less than $75,000, without the motors." And if you'll add the present market value of a pair of Curtiss aviation engines, you'll have a fair idea of the extent to which Jenkins has dipped into the bank account.

The late Bill Sturm, manager for Sir Malcolm Campbell during the now retired speed king's American activities, once reported that the "Bluebird" had cost "at least $100,000," and that was before its final run at Bonneville at the 301.1292 miles per hour gait in 1935.

Jenkins' first plan was to race his new "Mormon Meteor" 24 hours, equipped with only one of the Conqueror engines, in an effort to sweep every endurance record in the books up to that point. Then if conditions were in order, he planned to continue

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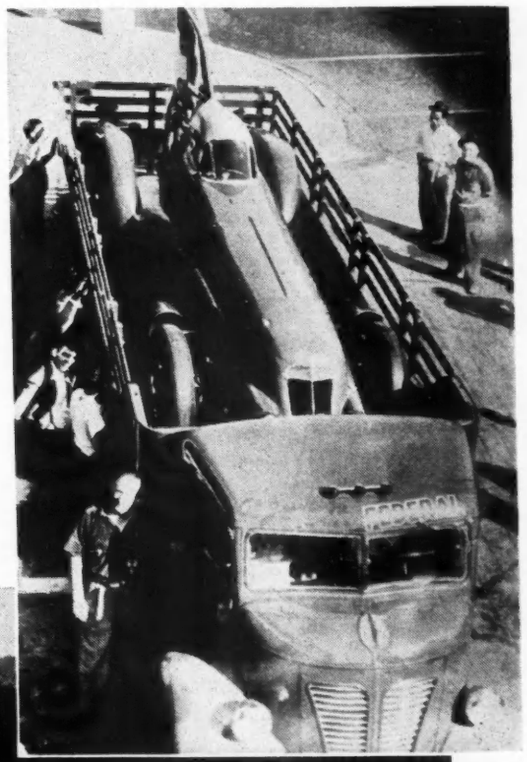
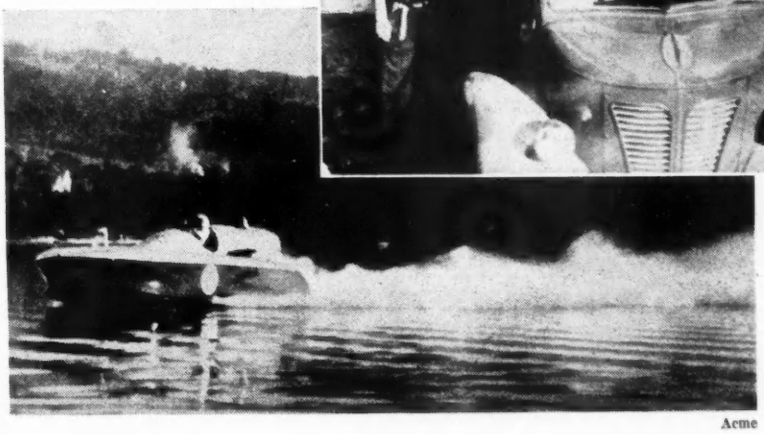
SPEED Messrs. Eyston and Cobb, having ended their Bonneville encampment, Ab Jenkins, America's hope for returning the mile land speed mark to this country, remained in complete charge of the expansive salt flats. Ab Jenkins' "Mormon Meteor III" is pictured here as it was loaded on a truck after trial runs at the Indianapolis speedway. The car is being taken to Bonneville Salt Flats where, after making endurance runs, Jenkins will attempt to better Eyston's mark of 357.50 m.p.h. for the mile.

Sir Malcolm Campbell is shown in his speedboat "Bluebird" as he established a new world record on Lake Hallwil, near Lucerne, Switzerland. He covered the measured mile at an average speed for two runs of 130.91 m.p.h. Previously Campbell had held the record with 129.50 m.p.h. He is said to be considering Utah's Great Salt Lake for his next attempt.





Acme

News of the Industry

. . . SLANTS

WRITING *in the October number of* The Austin Magazine *(London) "Visor" reports that the word "deceleration" is not found in the Oxford Dictionary or Webster's and we are "therefore safe in assuming that it is not a real word, only a piece of spurious coinage by the motoring fraternity." Page 679 of our 1937 Webster refutes "Visor" beyond question. Decelerate and deceleration are in the book, and right up top in the large print, too.*

METAMORPHOSIS—*The Peerless Corp., well known formerly as a manufacturer of automobiles, but more recently a brewing firm, has changed its name to Brewing Corp of America.*

ADVERTISING NEWS NOTES

● Automobile advertisements are counted upon to cut the current decline in magazine and newspaper space during October, because of several early announcements and "teaser" advertisements. The outlook for the balance of the year is good, particularly with the generous appropriations, both rumored and announced. Tire and gasoline space will be increased, as will some accessory advertising, agency executives believe.

● Pines Winterfront Co., Chicago, has appointed Paul Grant Advertising Agency to handle its sales promotion and advertising.

● DeSoto's advertising, featuring Lowell Thomas, is attempting to put into cold type the radio announcer's breathless excitement in announcing the new line. Mr. Thomas is president of the New York Advertising Club.

● "Economy awards," made by J. I. Case Co., Racine, Wis., during recent wheat-plowing tractor contests will be used in the company's advertising campaign this autumn. Western Advertising Agency, Chicago and Racine, will handle the promotion.

● Karl H. Bronson, director of advertising and merchandising of the DeSoto division of the Chrysler Corporation, outlined "the most ambitious advertising campaign ever undertaken by the DeSoto division" at a dealer meeting in New York this week. Several hundreds of newspapers throughout the country will be used to promote the 1939 line, he said.

● Continental Lithograph Corp. has the contract for lithography of the outdoor posters used by Dodge, White Rose gasoline and Standard Oil of Ohio.

● The new campaign for Exide Batteries of Canada, Ltd., Toronto, Ont., began this week, with instructions sent out by The Jas. Fisher Co., Ltd., Toronto.

● Chevrolet Motor Division of General Motors is using 7500 poster boards to announce that it will present its 1939 models to the public on Oct. 22. This outdoor advertising program began on Oct. 1.

● Trade paper, newspaper, and general magazine editors and writers were entertained at the Lincoln-Zephyr preview Wednesday in New York. Mr. A. S. Hatch, in charge of Lincoln and Lincoln-Zephyr sales said, "Lincoln-Zephyr, we must remember, is a new car, first presented about this time three years ago. Since its introduction its public acceptance has been most gratifying. In its second year sales were double those the first year and in 1938, since June, it has led in sales in its price class."

Mr. J. R. Davis, general sales manager, Ford Motor Co., in introducing the new "Mercury 8" stated, "A new era of close cooperation between the Ford Co. and its dealers is under way. . . . Evidence of it is a new dealer sales agreement about to be offered, which is designed to safeguard the dealers' investment in the Ford-Lincoln business."

40 Years Ago

● Probably the only concern in this country who has manufactured an oil motor for hauling merchandise is the Best Manufacturing Co., San Leandro, Cal., who recently constructed for use in the mining regions of Western Australia a tractor or motor wagon equipped with power sufficient to haul other wagons. This tractor is furnished with a 75 h.p. motor. The fuel used is crude petroleum.

One of the chief difficulties encountered in the designing of this vehicle was the water jacket for cooling the cylinders of the motor, as no water is to be had during the 400 mile journey it will run at the Coolgardie mines. A satisfactory solution of the difficulty was found by utilizing the roof of the tractor, which is composed of 1100 feet of water pipes, into which the water passes and returns again to the tank after being cooled. In this manner the original supply of water does duty over and over again, with small loss by radiation, and the cost of operation is reduced materially.

The main driving wheels are 8 feet in diameter and have tires 14 inches wide. The motor has four cylinders, and speed is regulated by friction clutches.

From: *The Horseless Age*, October, 1898.

PUBLICATIONS AVAILABLE

The American Retail Federation has published a booklet covering **sales taxes**, a digest of 25 state laws in 23 states.*

The Chain Belt Co. has just released a 130-page catalog covering its Rex **roller chains and sprockets.***

Bulletin 220.4, of the Acheson Colloids Corp., discusses the why and how of the **graphoid surface.***

Acheson's folder 626 covers **treatment of screw threads with colloidal graphite.***

The October issue of "Tool Tips," published by the Ex-Cell-O Corp., contains an announcement and description of the new Ex-Cell-O **center lapping machine.***

* Obtainable from editorial department, AUTOMOTIVE INDUSTRIES. Address Chestnut and 56th St., Philadelphia.

THE TIRE FIELD

● Rims inspected and approved by the Tire & Rim Association for September, 1938, were approximately 44 per cent under the number for September, 1937. The September, 1938, figure was 819,089. Nine months' total for 1938 was about 67 per cent under the same months last year, with the 5,759,506 reported as inspected and approved for the 1938 period as compared with 17,428,695 for the first nine months of 1937.

● A. B. Hannay, secretary of the Rubber Association of Canada, has stated that during the first seven months of this year total Canadian production was 1,265,211 tires, a decline of 478,000 from the same period last year. Further evidence of the decline was noted in the importation of crude rubber which was 6,229,693 lb. less than for the first seven months of 1937.

Lower Tractor Prices

International, Minneapolis-Moline and Oliver Make Reductions

A general movement toward lower prices in the tractor field is reflected by recent announcements of substantial reductions by three prominent companies: International Harvester, Minneapolis-Moline, and Oliver Farm Equipment.

Price slashes from 5 to 12 per cent have been made on its all-purpose tractor line for 1939 by the International Harvester Co. The reductions range from $30 to $110 on steel wheel types, and from $60 to $140 for the pneumatic tire units. A $20 reduction in the price of the four-roll all-steel corn husker and shredder also has been made. On track laying type tractors, reductions were announced early in the summer but a further cut of $35 has been announced for the model T-20 track laying type.

Minneapolis-Moline Power Implement Co. has announced lower list prices on its tractors ranging from $50 to $150. A reduction of $35 also has been made on the price of the company's corn picker.

The Oliver Farm Equipment Co. has brought down the price of its rubber-tired tractor, Row-Crop 70, by $114. It also has made a reduction of $30 on the R-C 70 steel wheel.

Bendix Injunction Permanent

Lewis W. Hammond, sitting as special judge in the Circuit court at South Bend, Ind., has ordered made permanent an injunction restraining the Bendix Products Corp. from bargaining with the Bendix local union of the United Automobile Workers of America, CIO affiliate, for the plant police. Judge Hammond decided that the National Labor Relations Board had exceeded its authority in designating the CIO as the sole bargaining agency for the industrial police. The injunction was asked by the 29 Bendix plant police to prevent Bendix local No. 9, U.A.W.A., from acting for them in a wage and hour conference with the Bendix Products Corp.

The corporation and the union have both taken steps to appeal the case to the Indiana appellate court.

Ourselves and Government

Forestalling of Court Test of Wage and Hour Law Indicated; Briefs on "Six Per Cent Case" May Be Filed Next Week

A weekly check list of legislative, executive and judicial actions affecting the automotive industries. First appeared in June 25 issue, p. 831. Corrected to Oct. 13.

CONGRESS

Adjourned June 16, sine die. All members of House and 36 Senators retire or face election in Autumn.

Legislative Legacies

MONOPOLY INVESTIGATION. Members of the Temporary National Economic Committee (anti-monopoly) Committee met on Thursday to map further plans for the forthcoming inquiry.

WAGES & HOURS. Indications are that the Administrator is forestalling an early court test and adding to the general uncertainty surrounding the law, effective Oct. 24, by keeping its interpretations to a minimum. Some industry representatives have been unable to learn if a particular class of worker is to be covered or the Administrator's definition of a certain term. The answer to some queries has been that it is up to the courts to decide and that where doubt exists, the Administrator hopes there will be compliance. Interpretations which the act specifically empowers the Administrator to make will be issued along with occasional interpretative bulletins, but the latter will be confined largely to questions sufficiently free from doubt to publish, according to present plans.

The Adminstrator thus far has interpreted the terms maintenance men, watchmen, clerks, stenographers, messengers in interstate industries as being covered by the law.

CIVIL AERONAUTICS AUTHORITY. Administrator Clinton M. Hester has called a meeting for around Dec. 1 for final consideration of the CAA's airport survey due to be reported to Congress on Feb. 1.

Oct. 21 has been set by the CAA as the deadline for filing certificates of convenience by domestic and foreign air carriers. However, air carriers who were engaged in air transportation when the CAA Act was passed have 120 days more, during which they can file certificates and continue operations until their applications are approved.

DEPARTMENT OF JUSTICE

MONOPOLY. Status unchanged since report to AUTOMOTIVE INDUSTRIES issue of Aug. 13. Tentative consent decrees were reported drawn between the Department and the Chrysler Corp. and the Ford Motor Co., presumably for submission to independent finance companies and to the Federal Court at South Bend, Ind.

AIRCRAFT LABOR. The National Aeronautical Chamber of Commerce and the AFL's International Association of Machinists have filed briefs with the Walsh-Healey Government Contracts Board covering the controversial learner and apprentice problem and the question of geographical and other differentials. The Board had previously recommended establishment of a national minimum of 60 cents for most employees, 40 cents for learners but subsequently withdrew those recommendations pending further hearings.

STEEL LABOR. Walsh-Healey Board has deferred further its recommendations for minimum wages to be paid by steel companies doing government business, presumably because of uncertainty regarding methods of permitting smaller plants to pay slightly lower rates, thereby freezing wages at existing levels by honoring geographical differentials. Permitting wage differentials according to plant size and virtually abandoned several weeks ago because of a tentative but adverse opinion from the solicitor. If a final ruling does not sanction this move, the Board may grant wage differentials to small plants upon application.

The Board expects eventually to cover the automobile industry but its current rush of business has led to forecasts that this cannot be done for at least a year.

FEDERAL TRADE COMMISSION

SIX PER CENT CASE. FTC cited Ford and General Motors in July, 1937, complaining of false and misleading representations in advertising prices of automobiles. Case has been in trial examiner's hands for several weeks. The FTC brief is being mimeographed; may be filed next week.

FOB PRICES case vs. G.M. and Ford, in which FTC alleged price advertising was misleading because of failure to include standard equipment. Commission continues to defer setting a hearing date.

VS. GENERAL MOTORS on question of forcing dealers to purchase parts from GM sources only. Hearings, which started in New York on Aug. 16 under FTC Attorney Everett Haycraft, recessed for the holiday on Wednesday, continued on Thursday.

FAIR TRADE PRACTICE rules for retail automobile dealers, introduced at public hearings during last NADA meeting in Detroit (see A.I., April 30, 1938), are still under study by the FTC fair trade practice division headed by George McCorkle.

MANUFACTURER - DEALER investigation under the Withrow Resolution. The investigators currently are going into more states and contacting more firms.

LABOR RELATIONS CASES

FORD vs. NLRB. Board has been asked in Ford Motor Co. 149-page brief containing 438 exceptions to overrule Trial Examiner Thomas E. Kennedy whose intermediate report recommended reinstatement of 129 discharged workers with back pay at Richmond, Calif., assembly plant and granting of sole bargaining power to United Automobile Workers for 1277 production employes at the plant. The brief alleged that Kennedy "possessed a fixed bias and entertained a fixed prejudice against employers in general and in favor of unions and union activities."

Oral arguments on Nov. 1 ordered on recommendation of Trial Examiner Francis M. Shea that Ford Motor Co. be found guilty of violating National Labor Relations Act at Buffalo assembly plant. The examiner, Francis Shea, found that the company had discriminated against its workers and he ordered reinstatement of 50 employes with back pay.

On Monday the U. S. Supreme Court, acting on a technical interpretation of procedure under the Wagner Act, granted a petition of the Ford Motor Co. for a review of the Sixth Circuit Court opinion of last spring which permitted the National Labor Relations Board to reopen its case concerning alleged unfair labor practices at the Ford River Rouge plant. The Board successfully asked the Circuit Court to grant a motion to permit reopening of the case, a move sought by the Board in order to remedy what it was felt might be considered as procedural defects which would nullify a cease and desist order.

VULTEE AIRCRAFT. Board has scheduled an election before Nov. 1 at the Vultee Aircraft Division of the Aviation Manufacturing Corp., Downey, Calif., to permit wood pattern makers to vote for the AFL's pattern makers union, the CIO's automobile workers union, or for neither, as the collective bargaining representative.

WAR DEPARTMENT

CONTRACTS. Chevrolet division of General Motors Corp., Flint, Mich., has been awarded a $44,916.14 contract for 49 one and one-half ton trucks.

INTERSTATE COMMERCE COMMISSION

MOTOR CARRIER BUREAU. Effective date of the ICC order of July 12, prescribing hours of service regulations for common and contract carriers of property, has been postponed until Dec. 31. Further hearings will commence Nov. 4, in Chicago.

ICC has held that caravaning of automobiles is transportation subject to the Motor Carrier Act, whether towed by other vehicles or operated on their own power.

BUSINESS IN BRIEF

Written by the Guaranty Trust Co., New York

Continuing expansion of general business activity is evidenced. Recent buoyancy of business sentiment in this country has undoubtedly reflected the passing of the European crisis, although at no time had the upward trend of activity here been noticeably interrupted by the international tension.

The *Journal of Commerce* index of activity for the week ended Oct. 1 advanced to 86.6 from a revised figure of 86.1 for the preceding week. A year earlier the index stood at 103.1.

Railway freight loadings in the week ended Oct. 1 showed a gain of 22,385 cars, or 3.3 per cent above the number for the preceding week. Increased loadings were reported for all classes of commodities, the chief gain being in miscellaneous freight. The 697,938 cars currently reported exceed the loadings in any other weekly period since Nov. 6. 1937.

Professor Fisher's index of commodity prices at wholesale for the week ended Oct. 8 was 80.5, comparing with 80.4 a week earlier and 80.6 four weeks earlier.

Combined statements of the Federal Reserve banks on Oct. 5 recorded for the week then ended a further gain of $123,148,000 in member bank reserve balances; a decline of $1,696,000 in bills discounted; no change in bills bought; and a decrease of $222,000 in industrial advances. Estimated excess reserves of member banks, reflecting the further increase of $130,000,000 in that week, stood at $3,020,000,000.

News of the Industry

ON THE MARINE HORIZON

● The Matthews Co., of Port Clinton, Ohio, has developed a new 50-foot stock cruiser, claimed to be the fastest Diesel-powered boat in the country. Powered with a pair of new 165-hp. Gray General Motors Diesels, the cruiser attained a top speed of 23.5 m.p.h. in her trial runs. The cruising speed is 20.5 m.p.h., giving the craft a cruising range of approximately 1000 miles on full fuel capacity.

● More than a dozen American manufacturers of motor boats, marine engines and boating accessories are represented at the British Motor Boat Show which opened in London, Oct. 13. Chris Craft, Richardson, and Century boats are displayed and the marine engine exhibits include Gray, Lycoming, Buda, Chrysler, Kermath and Universal, and Bendix, Johnson, Elto, Evinrude and Clarke outboard motors.

HOW TO BUY A USED CAR

● If your used car is purchased from a new car dealer it is sometimes smart to make it during the last week of any given month. This is the dictum of Martin H. Bury, who tells the public "How to Buy a Used Car" in a recently published brochure. (Bury & Holman, Inc., Philadelphia, 25 cents.)

Many new car dealers like to clean out their used cars during the month in which they were traded, and in that last week of that month, such dealers either reduce prices or increase trade-in allowances, says Mr. Bury, who is a DeSoto dealer himself.

BRITISH TAKE FEWER U. S. CARS

● Dollar volume of U. S. cars imported by England is decreasing steadily. For August the decrease amounted to more than $50,000. During the first eight months of 1938 the dollar volume of American cars imported into Britain was practically halved. The approximate figures are as follows: 1937, $4,275,000; 1938, $2,090,000.

TO MEASURE NIGHT BLINDNESS

● An instrument said to require only 8 minutes to ascertain whether a person is deficient in vitamin A and afflicted with night blindness, now recognized as a major factor in night automobile accidents, has been announced by the American Optical Co. The instrument is called the Adaptometer.

The operaton of the Adaptometer, as explained by Dr. Neumueller, is quite simple. The subject is seated in a dark room facing the instrument. His eyes are fixed on a strong light in the upper part of the instrument. This light bleaches out the visual purple in his retina. After a 3-minute exposure, the bright light is turned off and the subject is apparently in complete darkness.

However, when the bright light is switched off a very weak test light is automatically switched on. The test light becomes visible to the subject only after sufficient regeneration of visual purple. The time of regeneration in normal cases should not exceed 5 minutes. If a longer time is needed, the subject is considered deficient in vitamin A and has night blindness.

A discussion of just what "night blindness" is appeared in AUTOMOTIVE INDUSTRIES, p. 868, issue of June 12, 1937.

WAGES AND EMPLOYMENT

● Willys-Overland Motors, Inc., and Textile Leather Corp. have signed new wage and working agreements. Both strengthened anti-strike clauses and stated that no wage reductions will be made during the life of the contracts. Willys provided slight increases in the wage scale for 250 workmen in the lower brackets.

● The results of a WPA white-collar project conducted in Philadelphia shows, according to one of WPA Administrator Hopkins' aides, that while age is no handicap to a skilled machinist in retaining a job, once he becomes unemployed age becomes a distinct liability in attempting to find another job.

The report, one of a series to be made on reemployment opportunities and changes in industrial technique, said that contrary to reports in 1935 and 1936 there was a labor shortage in the occupation, one out of eight machinists in Philadelphia was found to be unemployed.

MEN OF THE INDUSTRY

E. S. MACPHERSON is now chief engineer in charge of design of the Chevrolet Motor division of General Motors Corp.

ROBERT W. SLOANE, formerly associated with Monarch Governor Co. as engineer, is now with the Zenith Carburetor divison of Bendix Aviation Corp., Detroit.

A. S. MENASCO, vice-president and director of Menasco Mfg. Co., has resigned his office to spend six months vacationing in order to recuperate from a recent illness. **GARDNER W. CARR,** president of Menasco, will assume the sales and production duties formerly handled by Mr. Menasco.

W. O. KENNINGTON, managing director of Delco-Remy & Hyatt, Ltd., has resigned this office to concentrate his efforts as director of Vauxhall Motors, Ltd. Mr. Kennington will continue as chairman of the Delco board.

T. A. BOYD, head of the fuel department, Research Laboratories division of General Motors Corp., is chairman of the Detroit District Committee of the American Society for Testing Materials.

GEORGE W. WOLF, formerly assistant general manager of the General Motors Export Co., has been placed in charge of operations (supply, manufacturing, assembly and engineering) of General Motors Overseas Operations.

DR. D. P. BARNARD has been advanced to the position of associate director of research in charge of engine laboratories by the Standard Oil Co. of Indiana.

L. W. CHUBB, director of research, Westinghouse Electric & Mfg. Co., will lead discussion on the subject of "Fundamental Research in Industry" which is scheduled for the dinner meeting program of the American Society for Testing Materials to be held in Philadelphia, Oct. 17.

Chain Belt Co. has announced the election of **FRED V. GARDNER** as acting treasurer to fill the vacancy created by the recent death of **C. L PFEIFER,** and

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Bonneville

(Continued from page 453)

the run for 48 hours to give the English rivals "something to shoot at" when they return next year with distance speed cars.

At conclusion of the distance runs he plans to return to Indianapolis, if the car measures up to drafting room estimates, and bolt the second 12-cylinder engine on the rear, where a large gasoline tank will be carried during the sleepless run.

After the adjustments are made at Indianapolis, he will go back out to Bonneville in late November, or possibly December, if winter hasn't set in too far, and attempt to break Eyston's existing record.

Campbell to Try for New Water Record

Sir Malcolm Campbell, who recently increased the world water speed record to 130.91 m.p.h., is said to be considering Great Salt Lake in Utah for his record attempts next year. American boating officials point out that, while the high salt content of the Utah lake would be a contributing factor to increased speed, it is possible that the effect of the 4200-ft. altitude on Campbell's engine would overcome any advantage of the water's buoyancy. However, Sir Malcolm's latest record run was made on Lake Hallwil in Switzerland, which is 1515 ft. above sea level, nearly 1000 ft. above Lake Maggiore, where he had been unable to break his old record of 129.5 m.p.h.

Cadillac, LaSalle Announce '39 Prices

Price reductions ranging to $77 on the LaSalle and as high at $100 on the Cadillac were announced this week. Prices for the 1939 line, together with the reduction from this year's models, are as follows:

	1930 Price	Decrease
LaSalle		
Coupe	$1,240	$57
2-door sedan	1,280	77
4-door sedan	1,320	77
Convertible coupe	1,395	25
Convertible sedan	1,800	25
Cadillac		
Coupe	1,610	85
4-door sedan	1,680	100
Convertible coupe	1,770	45
Convertible sedan	2,170	45
Fleetwood		
4-door sedan	2,995	85

King Cotton Courts Tire Industry

New Heat-Resistant Cord Developed by Bibb Mfg. Co. Claimed to Be Superior to Other Materials

One of the world's leading cotton manufacturers has found the automobile industry the most thrilling of all business romances, and the competition between cotton and rayon in tires is an added zest for him. William D. Anderson, president of Bibb Mfg. Co., Macon, Ga., told the National Association of Independent Tire Dealers at its convention in New Orleans, Oct. 12, that when properly manufactured, cotton cords were more resilient, rubber adheres better to them, they are less affected by water when the tread was worn down, and were cheaper than rayon.

Such a heat-resistant cord for automobile tires has been developed by the Bibb Mfg. Co. It is a cord of low gage, high density, and low "stretch" which is sold under the trade name Bibb HR cord. Among the claims made for this new product is that it not only resists the effects of high temperatures better than ordinary cord, but also reduces the generation of heat in the tire. In the "bone-dry" condition it has a materially higher tensile strength than ordinary cord.

HR cord is produced by twisting single cotton yarns into a ply, saturating the plied yarns to soften the natural gums and waxes of the cotton fiber, and twisting the saturated plied yarns while wet, under tension just short of the breaking point. This treatment is said to "fuse" the fibers with the softened gums and waxes retained therein.

WILLIAM D. ANDERSON

"The specifications a tire manufacturer hands a cotton mill today when he orders cord fabric looks almost like the specifications for a bridge."

An incidental advantage claimed for the new cord is that it holds the growth of tires to a minimum, and as a result practically eliminates tread cracks. In this connection it is pointed out that if tire growth is eliminated by the characteristics of the cord, the tire industry may employ rubber compounds that will give longer tread life.

While the principal characteristic of the new tire cord is its heat resistance, it is said also to have unusual resistance to stone-bruising. One of the most important characteristics of the cord is its recovery value. The ability of a tire cord to recover from fatigue and the rate of this recovery have a very direct relation to the life of the tire.

To bring out the operating characteristics of tires made with HR cord, the company gives figures of comparative tests made for it on six different 34 by 7-in. truck tires. The tests were carried out under an inflation pressure of 100 lb. per sq. in., under a load of 2800 lb., and at a room temperature of 100 deg. Fahr. One of these tires was made of HR cord, while the remainder were made of ordinary cord. The tire of HR cord outlasted all others, running 172 hours. The temperature under the tread never rose above 200 deg. Fahr. in the HR cord tire, while in one tire that failed after a few hours it reached 290 deg. Fahr., and in all it exceeded 200 deg. at one stage of the test or another. After 24 hours, whereas the circumference of one tire had increased 1⅝ in., that of the HR cord tire had increased only 19/32 in.

Where material is subjected to flexure, some of the fibers are under tension and others under compression, and for a given flexure the maximum stress is lower the thinner the specimen. Owing to the low gage of the HR cord, the side walls of the tire can be made thinner. Another factor in the failure of cord is the slippage or displacement of the fibers, which increases as wear takes place. In the HR cord the fibers are bonded together.

As compared with synthetic cords, which have become a factor in the tire industry, the advantage is claimed for the HR cord that it does not require a special chemical treatment to ensure proper adherence of the Latex. Owing to the very low stretch of the HR cord, tire manufacturers must adjust their processes to the characteristics of this new material, but this is said to involve no particular difficulty.

In Fig. 1 are shown break values at 300 deg. Fahr. for a number of different types of cord over a period up to 36 hours. All cords were of 21/5/3 gage, except the synthetic cord, which was of the equivalent 5/3 type. The cords were placed in an oven maintained at 300 deg. Fahr. and were broken immediately upon being withdrawn. Fig. 2 shows the

(Turn to page 460, please)

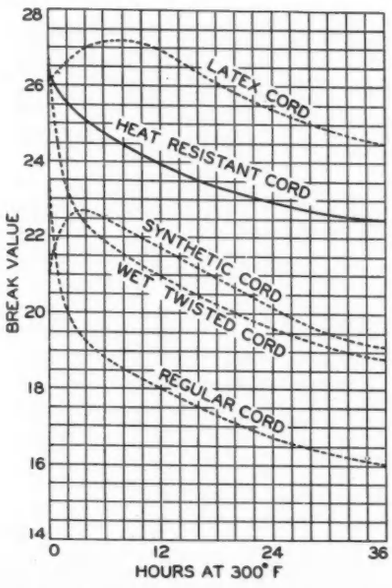

Fig. 1—Effects of high temperatures on various tire cords

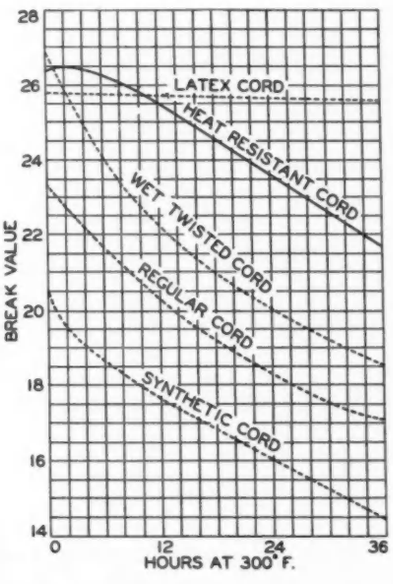

Fig. 2—Results of recovery test on various tire cords

News of the Industry

COMING EVENTS

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● Dates of the Paris Salon have been changed. The war threat found France with about 10 per cent of her workers called up for military service and production generally disorganized. As a result, instead of opening on Oct. 6 as originally planned, the show will open on Oct. 13 running until Oct. 23.

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Other papers of automotive interest are: "Resistance Welding in the Automotive Industry," by A. DiGiulio, Ford Motor Co.; "Automatic Carbon Arc Welding in the Automotive Industry," by F. M. Maichle, Lincoln Electric Co.; "Use of Welding in Reconditioning Used Cars," by T. W. Moss, Chrysler Motors Service.

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Milwaukee, Wis., Automobile Show, Nov. 12-19
Minneapolis, Minn., Automobile Show, Nov. 12-19
Boston, Mass., Automobile Show, Nov. 12-19
Los Angeles, Calif., Automobile Show, Nov. 12-20
St. Louis, Mo., Automobile Show, Nov. 13-19
Elmira, N. Y., Automobile Show, Nov. 14-19
De Moines, Iowa, Automobile Show, Nov. 14-19
New Haven, Conn., Automobile Show, Nov. 14-19
Omaha, Neb., Automobile Show, Nov. 15-20
Indianapolis, Ind., Automobile Show, Nov. 19-25
Baltimore, Md., Automobile Show, Nov. 19-26
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Kansas City Automobile Show, Nov. 26-Dec. 3
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Berlin, Germany, Automobile Show, Feb. 17-March 5

MERGERS

● Nash - Kelvinator Corp. stockholders have voted to end the corporate entity of the subsidiary Seaman Body Corp. The action was explained as a move to "bring the legal ownership of the body plant into line with the actual operating control under the Nash-Kelvinator Corp."

● Announcement has been made of the consummation of a plan for the purchase of the entire capital stock of the Manufacturers' Finance Co., Baltimore, subject to assent within 30 days by 90 per cent of each class of its outstanding stock, by Commercial Credit Co., which reserves the right to acquire a lesser amount should it so desire.

LIBBY'S THIRD QUARTER

● Libby-Owens-Ford Glass Co. has reported $850,596 net earnings for the third quarter of this year. This is equal to 34 cents a share on common stock and provides net profit of $428,705, or 17 cents a share, for the first nine months of 1938. This compares with $8,848,158, or $3.53 a share, for the same period last year. Dividend for fourth quarter will be considered at a November meeting.

J. D. Biggers, president, said the fourth quarter outlook is favorable with inventories lower than at June 30. He also stated that more than 1700 employes have been recalled to work in the third quarter and that customer inventories are in a healthy condition.

MACHINE TOOL ORDERS

● The index of machine tool orders prepared by the National Machine Tool Builders' Association declined slightly for September, the first downward movement reported since May. The September index is reported at 117.4. In August the index was 120.9; a year ago, 210.7. The tapering off in September, however, was not large enough to affect adversely the three months' average trend which continues upward.

Dealer Stocks

Estimated Low of 137,938 at Sept. 1; Further Reduction Forecast

Dealer stocks of passenger automobiles are estimated by AUTOMOTIVE INDUSTRIES to have reached a low ebb of 137,938 units by the first of September. A further slight reduction of car stocks in the hands of U. S. dealers is foreshadowed by a September factory-sales figure of 85,220 reported by the Automobile Manufacturers Association. Retail sales of passenger cars in the United States during September are expected to have exceeded the proportion of the A.M.A. factory sales figures normally going into U. S. passenger car retail sales channels.

The favorable inventory position at the beginning of the 1939 selling season gains further authority from analysis of a survey by Dun & Bradstreet, which shows that automobile manufacturers reduced their inventories during the first six months of 1938 five times as rapidly as manufacturers in other industries, and that automobile dealers, in turn, reduced their stocks—especially used cars—five times as rapidly as the average for other retail trades.

Of factory sales in September, General Motors units accounted for 36,335 of the 85,220 total for the industry in the U. S. and Canada. For General Motors this compares with a figure of 82,317 in September, 1937.

Automotive Metal Markets

Labor Troubles Cause Uneasiness Among Steel Producers; London Market Soars After War Scare

Volume of steel shipments to automobile manufacturers and parts makers is well maintained, mills reporting specifications against commitments on their books coming through in good shape, but fresh buying running mostly behind shipments. Price irregularities are reported in flat steels, indicative of intensive competition among steel producers for all desirable business. Taking it all in all, however, the steel market continues to rule steady. Labor troubles, philosophically accepted as an inevitable concomitant of an uptrend in business, nevertheless cause a certain amount of uneasiness. These outbreaks are not confined to the plants of automotive consumers, but the steel industry itself was reminded this week of smoldering labor agitation when the C.I.O. called a strike in a New York wire drawing and fabricating plant, affecting 2800 workers. Announcement of the Public Contracts Board's decision on steel wages is expected in the next few days, and wage scales approved by the Board for Government orders will furnish a guide to the steel industry's wage policy in the immediate future. Strip mills have added to their run of orders from parts makers. More small lot business in cold finished carbon and alloy steel bars is also noted. Wire mills report better inquiry from screw and bolt makers for automotive use. Finishing mills generally are operating at slightly better a rate than is indicated by this week's estimate of employed ingot capacity, which the American Iron & Steel Institute gives as 51.4 per cent against 47.9 per cent last week and 45.3 per cent a month ago.

Having recovered their pep following the war scare, London speculators staged a spectacular bull performance, resulting in an advance of around $30 a ton in the price of spot Straits tin and of about ¾ cent a pound in the export price of copper in the course of a week. Almost entirely as the result of the speculative demand for copper abroad, the price of spot electrolytic here rose to 10¾ cents, compared with 10⅜ cents at the beginning of the month. Prices for automotive brasses and copper products were advanced to the extent of the rise in the metal. Accompanying the news of higher prices in London was the information that copper producers, operating under the restriction scheme, will lift their output to 105 per cent of theoretical capacity on Oct. 15, over the 95 per cent rate, which had been in effect since July 1. The sharp advance of copper on the London Metal Exchange was in part ascribed to heavy Japanese buying.—W. C. H.

Production

(*Continued from page* 451)

new cars and trucks off its final assembly lines. This compares with slightly more than 26,000 during the previous week and should bring the total for the first two weeks in October to approximately 66,000 units. Production for the entire month of September was 85,200 cars and trucks, according to the monthly estimate released by the Automobile Manufacturers Association.

The rise during the current week can be attributed almost entirely to increases in the schedules of a majority of the producers now well advanced in their assembly of 1939 models. This is particularly true of Chevrolet and Ford, although a number of other important producers also were showing significant increases over previous weeks' runs. Chevrolet during the week completed its 14 millionth car.

The only newcomer to the list of companies actively engaged in 1939 production was Nash which, following settlement of its labor dispute, was expected to get its final assemblies under way. This left only Hupmobile, Graham and Willys still in preparatory stages for final assembly. Graham was planning to begin final assemblies by Oct. 17.

Divisions of General Motors were expected to account for better than 16,000 of the week's production total, followed by approximate 7800 by Chrysler divisions and 5500 in Ford and Lincoln plants. Hudson, with an anticipated 2100, was expected to lead the independents although followed closely by Studebaker and Packard.—J. A. L.

New Lamp

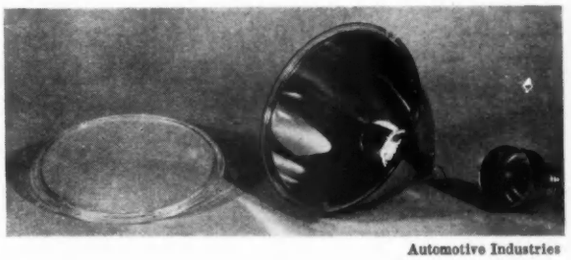
(*Continued from page* 451)

For industrial applications, the new lamp is available in two types, the "projector spot" and the "projector flood," both in the 150-watt classification at 110 to 120 volts, and with a rated average life of 1000 hr. The maximum overall length of each of these lamps is 5⅝ in., and the essential difference between them is in the fused-on lens, designed in one case to give a high-intensity spot light, and in the other for wider beam characteristics. Both lamps have a medium screw-skirted base and list at $1.70.

The gas content of the new lamp is a mixture of nitrogen and argon and the parabolic reflectors are coated with a new, patented material which is said to have exceptionally good reflection characteristics. Besides being heat-resistant, the glass shell is designed to resist cracking from impact. The industrial-type lamp will operate satisfactorily in any position, and it is recommended by the manufacturers for many applications, outdoors as well as within industrial plants and stores.

Highlights of New UAW Campaign

Highlights of the week in the UAW'S current campaign for a temporary 32-hour week throughout the automotive industry were—conferences between UAW committees and executives of Chrysler Corp., anticipated similar conferences with General Motors officials, informal discussions between Homer Martin, UAW president, and Harry Bennett, personnel director for Ford Motor Co., including a two-minute conversation between Martin and Henry Ford, refusal of Plymouth Motor employes, in number, to work more than 32 hours the day after the board's announcement from Washington and resultant closing for a day of the Briggs Mfg. Co. plant supplying Plymouth with bodies.



Automotive Industries

Dis - assembled view of the new GE lamp equipped with flood-lighting lens

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● Announcement has been made of the consummation of a plan for the purchase of the entire capital stock of the Manufacturers' Finance Co., Baltimore, subject to assent within 30 days by 90 per cent of each class of its outstanding stock, by Commercial Credit Co., which reserves the right to acquire a lesser amount should it so desire.

LIBBY'S THIRD QUARTER

● Libby-Owens-Ford Glass Co. has reported $850,596 net earnings for the third quarter of this year. This is equal to 34 cents a share on common stock and provides net profit of $428,705, or 17 cents a share, for the first nine months of 1938. This compares with $8,848,158, or $3.53 a share, for the same period last year. Dividend for fourth quarter will be considered at a November meeting.

J. D. Biggers, president, said the fourth quarter outlook is favorable with inventories lower than at June 30. He also stated that more than 1700 employes have been recalled to work in the third quarter and that customer inventories are in a healthy condition.

MACHINE TOOL ORDERS

● The index of machine tool orders prepared by the National Machine Tool Builders' Association declined slightly for September, the first downward movement reported since May. The September index is reported at 117.4. In August the index was 120.9; a year ago, 210.7. The tapering off in September, however, was not large enough to affect adversely the three months' average trend which continues upward.

Dealer Stocks

Estimated Low of 137,938 at Sept. 1; Further Reduction Forecast

Dealer stocks of passenger automobiles are estimated by AUTOMOTIVE INDUSTRIES to have reached a low ebb of 137,938 units by the first of September. A further slight reduction of car stocks in the hands of U. S. dealers is foreshadowed by a September factory-sales figure of 85,220 reported by the Automobile Manufacturers Association. Retail sales of passenger cars in the United States during September are expected to have exceeded the proportion of the A.M.A. factory sales figures normally going into U. S. passenger car retail sales channels.

The favorable inventory position at the beginning of the 1939 selling season gains further authority from analysis of a survey by Dun & Bradstreet, which shows that automobile manufacturers reduced their inventories during the first six months of 1938 five times as rapidly as manufacturers in other industries, and that automobile dealers, in turn, reduced their stocks—especially used cars—five times as rapidly as the average for other retail trades.

Of factory sales in September, General Motors units accounted for 36,335 of the 85,220 total for the industry in the U. S. and Canada. For General Motors this compares with a figure of 82,317 in September, 1937.

Automotive Metal Markets

Labor Troubles Cause Uneasiness Among Steel Producers; London Market Soars After War Scare

Volume of steel shipments to automobile manufacturers and parts makers is well maintained, mills reporting specifications against commitments on their books coming through in good shape, but fresh buying running mostly behind shipments. Price irregularities are reported in flat steels, indicative of intensive competition among steel producers for all desirable business. Taking it all in all, however, the steel market continues to rule steady. Labor troubles, philosophically accepted as an inevitable concomitant of an uptrend in business, nevertheless cause a certain amount of uneasiness. These outbreaks are not confined to the plants of automotive consumers, but the steel industry itself was reminded this week of smoldering labor agitation when the C.I.O. called a strike in a New York wire drawing and fabricating plant, affecting 2800 workers. Announcement of the Public Contracts Board's decision on steel wages is expected in the next few days, and wage scales approved by the Board for Government orders will furnish a guide to the steel industry's wage policy in the immediate future. Strip mills have added to their run of orders from parts makers. More small lot business in cold finished carbon and alloy steel bars is also noted. Wire mills report better inquiry from screw and bolt makers for automotive use. Finishing mills generally are operating at slightly better a rate than is indicated by this week's estimate of employed ingot capacity, which the American Iron & Steel Institute gives as 51.4 per cent against 47.9 per cent last week and 45.3 per cent a month ago.

Having recovered their pep following the war scare, London speculators staged a spectacular bull performance, resulting in an advance of around $30 a ton in the price of spot Straits tin and of about ¾ cent a pound in the export price of copper in the course of a week. Almost entirely as the result of the speculative demand for copper abroad, the price of spot electrolytic here rose to 10¾ cents, compared with 10⅜ cents at the beginning of the month. Prices for automotive brasses and copper products were advanced to the extent of the rise in the metal. Accompanying the news of higher prices in London was the information that copper producers, operating under the restriction scheme, will lift their output to 105 per cent of theoretical capacity on Oct. 15, over the 95 per cent rate, which had been in effect since July 1. The sharp advance of copper on the London Metal Exchange was in part ascribed to heavy Japanese buying.—W. C. H.

Production

(*Continued from page* 451)

new cars and trucks off its final assembly lines. This compares with slightly more than 26,000 during the previous week and should bring the total for the first two weeks in October to approximately 66,000 units. Production for the entire month of September was 85,200 cars and trucks, according to the monthly estimate released by the Automobile Manufacturers Association.

The rise during the current week can be attributed almost entirely to increases in the schedules of a majority of the producers now well advanced in their assembly of 1939 models. This is particularly true of Chevrolet and Ford, although a number of other important producers also were showing significant increases over previous weeks' runs. Chevrolet during the week completel its 14 millionth car.

The only newcomer to the list of companies actively engaged in 1939 production was Nash which, following settlement of its labor dispute, was expected to get its final assemblies under way. This left only Hupmobile, Graham and Willys still in preparatory stages for final assembly. Graham was planning to begin final assemblies by Oct. 17.

Divisions of General Motors were expected to account for better than 16,000 of the week's production total, followed by approximate 7800 by Chrysler divisions and 5500 in Ford and Lincoln plants. Hudson, with an anticipated 2100, was expected to lead the independents although followed closely by Studebaker and Packard.—J. A. L.

New Lamp

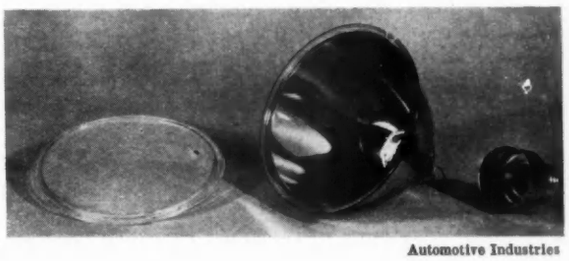
(*Continued from page* 451)

For industrial applications, the new lamp is available in two types, the "projector spot" and the "projector flood," both in the 150-watt classification at 110 to 120 volts, and with a rated average life of 1000 hr. The maximum overall length of each of these lamps is 5⅝ in., and the essential difference between them is in the fused-on lens, designed in one case to give a high-intensity spot light, and in the other for wider beam characteristics. Both lamps have a medium screw-skirted base and list at $1.70.

The gas content of the new lamp is a mixture of nitrogen and argon and the parabolic reflectors are coated with a new, patented material which is said to have exceptionally good reflection characteristics. Besides being heat-resistant, the glass shell is designed to resist cracking from impact. The industrial-type lamp will operate satisfactorily in any position, and it is recommended by the manufacturers for many applications, outdoors as well as within industrial plants and stores.

Highlights of New UAW Campaign

Highlights of the week in the UAW'S current campaign for a temporary 32-hour week throughout the automotive industry were—conferences between UAW committees and executives of Chrysler Corp., anticipated similar conferences with General Motors officials, informal discussions between Homer Martin, UAW president, and Harry Bennett, personnel director for Ford Motor Co., including a two-minute conversation between Martin and Henry Ford, refusal of Plymouth Motor employes, in number, to work more than 32 hours the day after the board's announcement from Washington and resultant closing for a day of the Briggs Mfg. Co. plant supplying Plymouth with bodies.



Dis - assembled view of the new GE lamp equipped with flood-lighting lens

Automotive Industries

News of the Industry

AIRCRAFT ACTIVITY

● "It is 300 per cent safer to fly this year than it was in 1930," said Edward J. Noble, chairman, Civil Aeronautics Authority, in an address at the "National Air Travel Week" luncheon on Oct. 6. "The airline ratio is one fatal accident to each 12,000,000 miles of flying. At that rate you can fly around the world four hundred and eighty times before you need be afraid of flying into it! That figure is absolutely correct and it is something for timid souls to think about.

"It would be a wonderful thing if the airline operators could sit in a board room and decide not to have any more accidents because accidents are bad for business. Unfortunately they can't do that as easily as they can decide to cut fares or buy new equipment. But they have done the next best thing, which is to agree on a cooperative and conservative plan of operations for this winter so that the chance of getting into trouble will be reduced as far as it is humanly possible.

"They have agreed upon the adoption of standard weather regulations so if one line does not fly the other lines will not fly over a given territory. They are also going to slow down schedules. This is certainly in the public interest and is sure to result in increased safety."

● The U. S. Customs Bureau reports that air traffic between this country and foreign countries increased 13.5 per cent during the fiscal year 1938 with 6639 airplanes arriving in the United States and its possessions from foreign countries as compared with 5851 during the preceding fiscal year. Airplane passengers, however, increased 17.7 per cent, with 45,847 arriving in 1938, more than half of whom came in through the Florida customs district. Airplanes entering through the Vermont district increased five times of the 1937 fiscal year rate and passengers increased six times. The fiscal year 1938 was the seventh consecutive year in which both airplanes and passengers entering this country increased.

A subcommittee, composed of Larry G. Fritz of Transcontinental & Western Air; Hugh Smith, of American Airlines; Frank Caldwell, of United Air Lines and Larry Pabst, of Eastern Air Lines, will meet in Chicago the week of Oct. 17 with Earl F. Ward, chief of CAA's airways operation division.

● The Grumman Aircraft Engineering Corp. has received a $754,000 contract from the U. S. Navy for 20 amphibian planes, model J3F3. This model is said to be similar to model J2F2 of which the corporation is now constructing 30 for the Navy. The planes are used for general utility work with the fleet.

● DeHaviland Aircraft of Canada, Ltd., Toronto, Ont., has shipped parts of its first military aircraft to England under the contract which calls for 200 planes in all. Airplanes are not being sent over complete but essential parts are shipped to the English company where they are assembled, officials explained. This procedure will be followed in case of all 200 ships.

Reorganization plans which have been held in abeyance for some weeks will again be discussed now that plans of Canadian aircraft manufacturers as regards military orders have become clarified, according to Phil C. Garrat, managing director.

Clarification of plans referred to was the recent organization of Canadian aircraft firms under a central company to handle details in connection with British orders for Canadian planes.

● Applications for certificates of convenience and necessity covering 19 new and 18 existing air line routes have been filed with the Civil Aeronautics Authority, it has been announced. The 19 new routes, very largely in the Mississippi valley, would add more than 9000 miles to the existing air transportation system of 32,000 miles in the United States. The Civil Aeronautics Act requires the issue of certificates to lines continuously operating from May 14, 1938 and to nine routes specified in that section of the Act, for which the Postoffice Department has let or advertised mail contracts.

● The Curtiss Aeroplane and Motor division of Curtiss-Wright Corp. in Buffalo is working at capacity levels, turning out fighting planes for the Army and Navy.

The Army ordered $4,500,000 worth of P-36's (pursuit planes) several months ago and these ships are being rushed to completion. The rush order has put the Curtiss plant on a night shift and calls for 210 planes and 20 spares and parts.

● The Lockheed Aircraft Corp., Burbank, Cal., has completed the first of 13 modified Lockheed 12 commercial air liners ordered by the Army Air Corps. The planes are to be used for transportation and training pilots in the operation of multi-engined equipment. It is reported that all thirteen will cost $570,913 with spare parts.

King Cotton

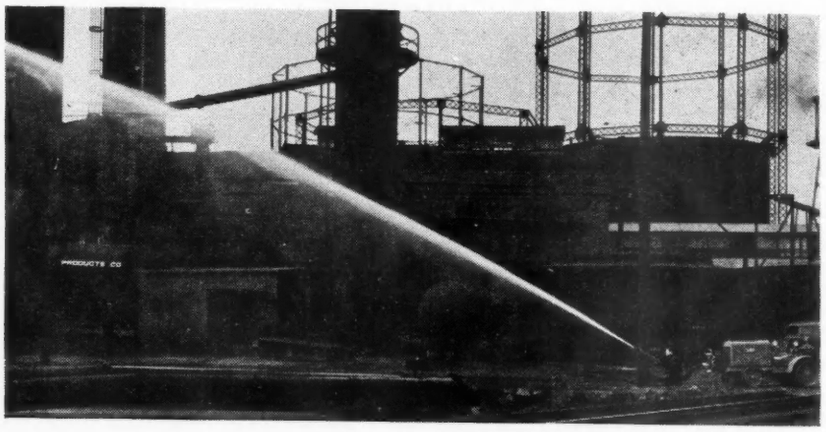
(Continued from page 457)

results of a comparative recovery test on the same cords. The cord was placed in an oven at 300 deg. Fahr., and upon removal was conditioned in an atmosphere of 6.5 per cent regain for 36 hours before being broken. It will be noticed that next to the Latex cord the HR cord maintains its break value best.

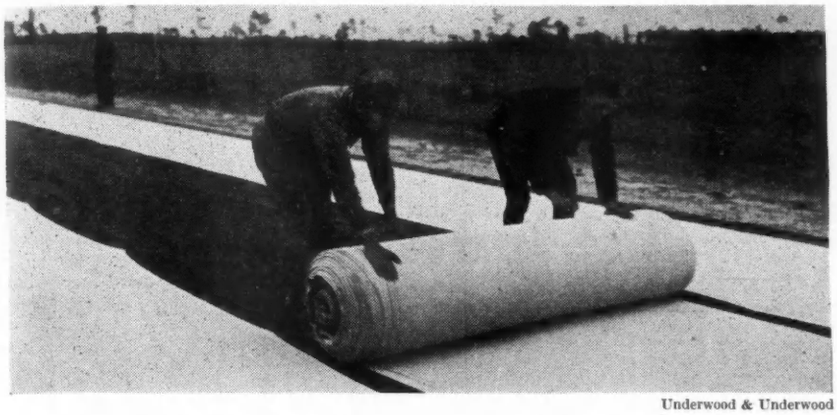
HR cord is said to have passed the experimental stage, more than a million pounds of it having been used in experimental and demonstration work. We are informed that tires made with Bibb HR cord will be slightly more expensive than those made with regular cord, but that the advantages gained by the special treatment will far outweigh the little additional cost.

● Plans are being made for the offering of stock in White Aircraft, Ltd., an Ontario corporation formed in August, 1938. Preparations are understood to be almost complete but actual offering may be delayed because of the disturbed conditions prevailing in the security markets. Capitalization consists of 500,000 common shares, of which 200,028 shares have been issued for assets. An additional 1,200,000 shares have been underwritten or optioned at prices to net the company $200,000, if all taken up. White Aircraft has British Empire rights to the White amphibian, a four-place machine, selling around $12,000, and the world rights, exclusive of the United States, to the White Hawk, a smaller machine selling at around $4,000. The company states that it also plans to manufacture a plane of another design, which will be of a heavier type.

● Installation of new radio direction finding ground stations as a further safety aid to domestic airlines was approved by the Civil Aeronautics Authority late last week at a meeting of air transport operation managers and members of the Air Safety Board. Three airlines also announced at the meeting that a voluntary reduction in cruising speed of air transport planes during winter months will be below those agreed on last season.



DOUBLES for trouble. The Clarktor-6 industrial tractor at the right of the picture carries a centrifugal pump designed to handle auxiliary fire protection or scavenging jobs around industrial plants. The pump installation does not interfere with the tractor's regular assignment in materials' handling. Manufactured by Clark Tructractor, Battle Creek, Mich., the combination unit is powered by a 6-cyl., 46 hp. engine. A patented power takeoff delivers torque to the pump, which is capable of supplying 400 gal. per min. at 120 lb. pressure, at an engine speed of 1800 r.p.m., when the water supply comes from a four-inch orifice, with a 30 lb. pressure. Many other versatile types of materials' handling equipment will be described in AUTOMOTIVE INDUSTRIES for Nov. 19 in an article describing "Precise Flow of Materials as Arranged in Automobile Plants."



Underwood & Underwood

CARPET At a cost of $70 per mile this road being built near St. Joseph, Fla., is covered with the cotton fabric which two workers are here shown unrolling over the surface. This carpet-like base is flattened, "tacked" at the edges and coated with crushed rock and asphaltic bond. This treatment, it is claimed, eliminates washboarding and potholes.

How Sales Abroad Are Stimulated

The Automotive-Aeronautics Division of Commerce Department Has Urged Foreign Buying of U. S. Automotive Products for 17 Years

The Automotive-Aeronautics division of the Commerce Department's Bureau of Foreign and Domestic Commerce, whose job is to promote foreign sales of American-made automotive products, rounded out 17 years of service this month with a substantial number of automotive experts among the bureau's 100 employes in 33 foreign countries, where the agency maintains regional offices.

Starting on its eighteenth year, the division is headed by a career man, Irving H. Taylor, who first went with the bureau in 1928 and who has been associated both directly and indirectly with the automobile industry since that time. The division's policy is to staff each of the foreign offices with men having some specialized training along automotive lines. Since the automotive division was first set up back in 1921, it has been headed by six different chiefs. Gordon Lee, foreign representative of the Willys-Overland Co., was the first one backing the days when the foreign sales of American-made automobiles, parts and accessories were valued at $83,500,000.

Mr. Lee's successors include Percy Owen, former president of Liberty Motors, Detroit, who is now president of a large baking concern in Grand Rapids, Mich.; H. O. Smith, president of the Turnsignal Corp., Philadelphia; A. W. Childs, assistant commercial attache at Rio de Janeiro; H. S. Welch, vice-president, Bendix Aviation Export Co., New York; and Mr. Taylor, the present incumbent. The rather rapid rate of turnover in division heads during the past 17 years is attributed to the fact that, especially in the early years, other pressing duties prevented longer periods in Washington and in many cases the heads of the division came to Washington at some financial sacrifice.

The Automotive-Aeronautics division is divided into three sub-divisions: the automotive, aeronautics and highway sections. The objectives of these three sections are identical—to stimulate foreign sales of American-made products — although the highway section necessarily proceeds along slightly different lines. The automotive section concentrates on sales of motor vehicles, marine engines, trailers, motorcycles, automotive parts, accessories, garage and service station equipment. Trade opportunities from abroad are disseminated to American manufacturers and exporters either directly or through one of the division's periodic publications. If X company out in Detroit asks for help in selling its products abroad, the division handles the query by supplying detailed information covering tariffs, import restrictions, exchange regulations, European competition and other information.

In addition to handling individual inquiries, the division publishes three times each month *The Automotive World News* which carries spot news from overseas countries on tariff changes, manufacturing and engineering developments, market surveys, and local regulations. Sent out weekly is revised foreign trade information on duty assessments, customs, regulations, taxation, market conditions, imports and exports, registrations and related data as part of the division's *Automotive Foreign Trade Manual.* A nominal subscription charge is made for both publications.

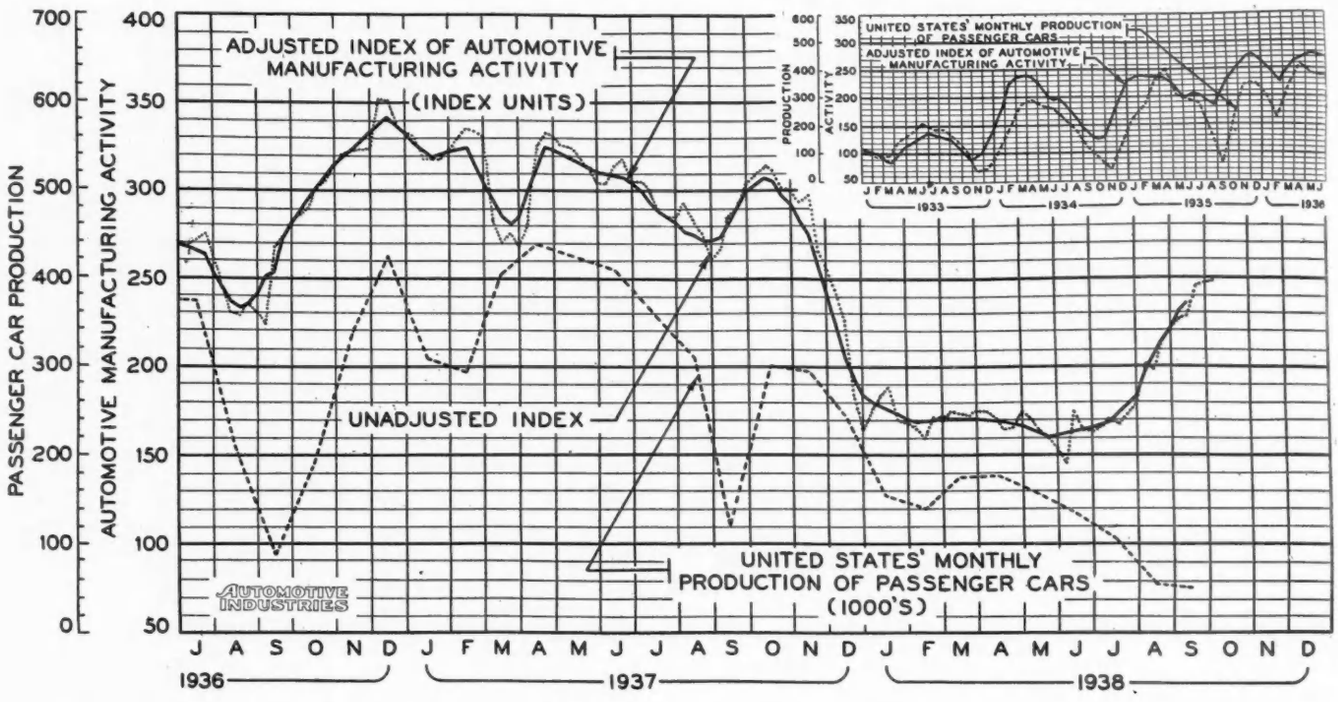
The Aeronautics section gathers and releases trade information on all types of aircraft and auxiliary products, and civil aeronautic development in foreign countries. Its coverage includes material on air treaties, international agreements, laws, regulations, air policies, transport services, traffic, foreign airports, and the manufacture and sale of aircraft. Queries from manufacturers are answered direct upon request and current items of interest are published in the *Aeronautical World News,* also issued three times each month together with the monthly exports of aeronautical products.

The aeronautics section was at one time a sub-division of the transportation division of the Bureau of Foreign and Domestic Commerce but in 1929 it was removed and set up as a separate unit. Subsequently the aeronautics division was consolidated with the automotive trade division in an economy move in 1933. Leighton W. Rogers, president of the Aeronautical Chamber of Commerce, and former United States commercial attache in Poland, headed the division for six years.

The highway section, established on the theory that road development and the use of motor vehicles go hand in hand, was first set up in 1925 as part of the transportation division and later transferred to the automotive division. Cooperating with other Government and trade groups, the highway section attempts to stimulate highway development overseas by encouraging the use of American methods, materials, machinery and vehicles to be used on the highways after completion. Among other things, the section conducts an annual study of world highways, the results of which are published in the highway section of the *Automotive World News.*

One of the duties of the highway section which is seldom publicized is that selecting, with the cooperation of other Government departments, representatives of this country to attend international gatherings where highways are up for discussion. When exhibits and charts on foreign highway developments are on display at annual conventions of such organizations as the American Roadbuilders' Association, the chances are 100 to 1 that they were prepared by the Highway division.

Automotive Activity Levels Off in Face of Seasonal Influences



Automotive manufacturing activity reached its highest 1938 level to date during the week ended Saturday, Oct. 8. The unadjusted index figure for that week is placed on the chart above at 249. The adjusted figure, which defines the accompanying trend curve and which lags four weeks behind the unadjusted figure in conformity with the statistical method applied, is placed at 236.

In relation to the data points for the preceding several weeks, the end points on both the unadjusted activity curve and its trend-defining companion curve show a decided slackening in the rate at which automotive manufacturing activity has been increasing rapidly and steadily since the end of May.

Assembly of 40,000 units during the week ending Oct. 15 will assist in compensating the activity curve for the apparent diminution in the rate of manufacturing parts and accessories. Apart from this, current indications point to a sharp drop in the general rate of automotive manufacturing activity, accompanied or followed shortly by a seasonal decline in assembly and sales of automobiles. As was the case last year, most of the market stimulation incident to the introduction of new models will have been worked off by show time, and the shows themselves will probably have little effect on sales.

News of the Industry

(*Continued from page* 456)

the election of **JOHN T. BROWN,** vice-president, to the board of directors. **G. M. DYKE,** assistant treasurer, was reelected and **A. F. KESSLER,** chief accountant, was elected an assistant treasurer.

KARL M. WISE has been appointed director of engineering for Bendix Products division of Bendix Aviation Corp.

W. S. KNUDSEN, president of General Motors Corp., has been reelected president of the Detroit Industrial Safety Council. **E. T. ASHMAN,** treasurer of Motor Products Corp., was elected chairman of the board of directors and **HUGH DEAN,** general manufacturing manager of Chevrolet Motor Co. was named vice-chairman. **HOYT L. FRACHER,** Detroit Steel Products Co., was reelected treasurer.

Vice-presidents of the board of trustees elected were: **C. W. AVERY,** Murray Corp.; **A. E. BARIT,** Hudson Motor Car Co.; **W. O. BRIGGS,** Briggs Mfg. Co.; **GEORGE R. FINK,** Great Lakes Steel Corp.; **EDWARD F. FISHER,** Fisher Body division of General Motors; **K. T. KELLER,** Chrysler Corp.; **ALVAN MACAULEY,** Packard Motor Car Co.; **ALFRED C. MARSHALL,** Detroit Edison Co.; **GEO. W. MASON,** Nash-Kelvinator Corp., and **W. E. OTTO,** Michigan Mutual Liability Co.

AUTOMOTIVE INDUSTRIES

Summary of Automotive Production Activity
(Week Ending Oct. 15)

BUSES One of the largest manufacturers reports production off about three per cent this week, with immediate future not too bright. The post-Labor Day pickup in bus orders expected by most producers has failed to materialize. However, one producer reports it is working on a three-shift 24-hour day basis because of recent increases in business.

TRUCKS Although sales were reported off in the New York area, general tenor is that present business and outlook are "satisfactory." One producer reports last week's orders 50 per cent ahead of those received in any single week since May. General feeling seems to be that truck trend will be upward slowly but steadily to result in a 30 per cent better year.

TRACTORS Three large producers this week announced price cuts in their tractor lines. Little change in production activity since last week's report.

AUTOMOBILES Production estimated at 40,000 units this week with increase attributed to definite rise in demand. Another producer this week joined the list now actively engaged in production of 1939 models. Estimates for the 1939 model year range between 3,000,000 and 3,500,000 cars and trucks.

MARINE ENGINES Virtually no change in activity since last week's report.

AIRCRAFT ENGINES Practically all available plant capacity now being used for production models, while experimental jobs keep engineering staffs working at top speed. One engine builder is now busy developing a fuel injector for its 50 h.p. engine.

This summary is based on confidential information of current actual production rates from leading producers in each field covered. Staff members in Detroit, Chicago, New York and Philadelphia collect the basic information, in all cases from official factory sources.

Just Among Ourselves

Straight from Mount Olympus

WITH the introduction of "Mercury" as a stablemate of "Zephyr," the Ford Motor Co. sets an interesting new trend for the naming of automobiles. It sent us back to old Bullfinch, whose "Age of Fable" has been the plague and the joy of generations of school children who began by wondering why it was necessary to learn about all that old stuff, and ended by discovering (sometimes) that the old Greek gods were very much alive.

Mr. Ford, I believe, is a hard-headed romantic. The Edison Institute and Greenfield Village bear this out; the romantic or sentimental aspects of his ventures have always a good hard background of purpose. Back of the Institute and the Village is the pervading purpose of preserving a system of American education which produced many examples of successful individualistic enterprise. Edison, Firestone, Burbank, and Mr. Ford himself became the living embodiments of the system.

Along with the concrete memorials of American pioneer education, Mr. Ford has preserved at Greenfield many other accompanying features of American life contemporary with the type of education which he is fostering. In other words, there is nothing sterile about his choice of monuments, or names for new automobiles, and this fact provides the impetus for still further digression.

Zephyrus (Zephyr) was, to the ancient Greeks, and to ourselves, the personification of the soft west wind. Enamored of Hyacinthus, who preferred Apollo, Zephyr was present one day when the other two were playing quoits. In a fit of jealousy, he deflected a quoit thrown by Apollo so it struck Hyacinthus and wounded him mortally. Otherwise, he was a useful and gentle soul, who makes a splendid spiritual prototype for a streamlined automobile.

Mercury, as is perhaps better known, was the son of Jupiter and Maia. He was the patron of commerce, wrestling, gymnastic games in general, and aside from a slight association with the shadier characters on Mount Olympus, was a pretty straightforward fellow. He and Apollo got along much better than Apollo and Zephyr. In fact the caduceus, or serpent-entwined rod with which Mercury is usually associated, and which will make a fine stylized trade mark for a new automobile, was presented to Mercury by Apollo. Apollo got in trade the lyre, which Mercury had invented on the shell of a tortoise, and whose nine strings were named for the Muses.

Well, it all seems very far away, except when one remembers there are 60,000 automobiles on the road, bearing the name of Zephyr, and that young "Mercury" under the Ford auspices will probably do all right. There's just one more thing: Please Mr. Ford, when the next member of the family comes along, name it Apollo!

Maybe You Missed This Point of View

EVERY editor is familiar with the fact that the appearance of an article containing controversial material often provokes discussion which ignores some of the principal points the article was intended to get across. Two recent examples of this in AUTOMOTIVE INDUSTRIES are the article by Arthur Fertig, which appeared July 9, and that by Thomas G. MacGowan which appeared Aug. 27, beginning on p. 254.

Mr. MacGowan's article was based on a field survey of consumer preferences as to the appearance of 1938 automobiles. The article appeared at the end of the 1938-model selling season, so, because no one was likely to be injured commercially by the publication of factual comparisons, we published them.

Since Mr. MacGowan's article on appearance-preferences appeared (it was the third of a series exploring various aspects of the consumer market for automobiles) its original appearance in the magazine has been augmented by the distribution of about 12,000 pamphlet reprints.

We know that the article has aroused considerable discussion in many quarters of the industry. Almost always, however, the discussion has approached the article as a pure market survey, and discussion has centered, for example, on why Packard should have been so far ahead of the pack in the results; or why automobile X should have appeared so far down in the list.

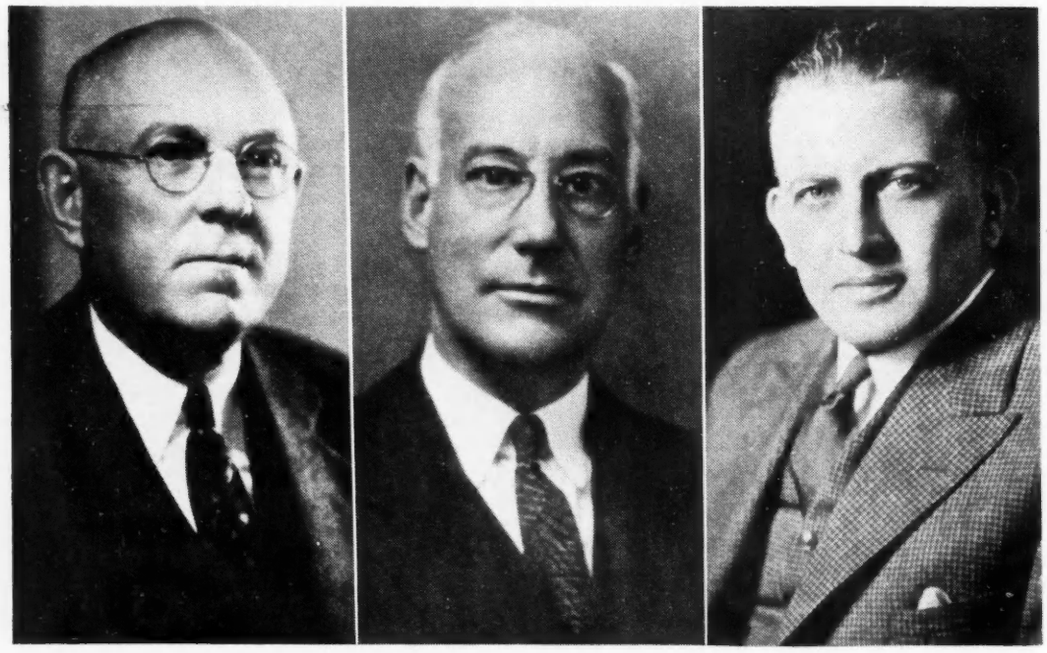
These are interesting matters for discussion wherever automobile men gather, but they ignore the essential point that the published results of the survey were intended primarily to illustrate a thesis.

Question: Using a scientifically developed technique, would it be possible in advance to find out with any degree of accuracy how the public is likely to react to the outward appearance of a projected automobile design? This is the question which Mr. MacGowan and AUTOMOTIVE INDUSTRIES set out to answer in the survey on which the article was based. We believe the results were affirmative. We believe the technique developed by Mr. MacGowan, with some modifications, would provide an interesting pre-check of whether the designers for X company were proceeding in the right direction with 1940 models. If this idea has any interest for you, read Mr. MacGowan's article again from that point of view.

What Do You Think?

A postcard, or letter, from you to me, saying whether you like the news section in this issue better than you did the news section in preceding issues, would be of help in determining what we should do about it in future issues.

—HERBERT HOSKING



(Left) William P. Woodside is vice president of the A.S.M. and a nominee for president. He is vice president of the Climax Molybdenum Co.

(Center) Bradley Stoughton, treasurer, is Dean of Engineering at Lehigh University.

E. C. Bain of the United States Steel Corp., is a trustee and past president of the A.S.M.

National Metal Congress

in its twentieth annual meeting and exposition brings together the latest developments in materials of automotive interest

By JOSEPH GESCHELIN

OPENING of the 20th Annual National Metal Congress and Exposition in Detroit's spacious Convention Hall on Oct. 17 not only is an acknowledgment of the motor city's basic position as the largest single user of all manner of engineering materials but constitutes an appreciation of the vital importance of materials in the design and production of automotive products.

With the passing of time it has become increasingly evident that materials dominate the future course of product development. The partnership of materials and their treatment in production processes has done much to reshape the thinking of engineers, metallurgists, and production experts, since the utilization of the modern alloys has made it possible to discard many traditional theories and practices.

Pointed examples of what we have in mind may be found in the new valve steels resistent to high temperatures, practically immune to the corrosion of products of combustion, practically unaffected by extreme temperature cycles. Alloys containing nickel and combinations of nickel, chromium, molybdenum, etc., make it possible to carry greater loads with less wear and for longer periods of time in gear trains that are surprisingly smaller packages than ever before.

In the field of heavy-duty transportation, the bugaboo of dead

20 Automotive Materials

weight has been effectively vetoed by the adoption of the low-alloy sheet steels and shapes which provide adequate factor of safety combined with a reduction in dead weight upwards of 50 per cent, in some instances.

Engineers, metallurgists, purchasing agents, and other technologists will be well rewarded by attendance at the Congress and Exposition which runs from Oct. 17 to 21. Almost 230 different organizations of metal producers, equipment manufacturers, process developers, and others join in the achievement of a living and moving panorama of materials and process in action. For the benefit of our readers we have appended a list giving the names of most of the principal exhibitors, and elsewhere in the article will be found thumbnail sketches of many of the exhibits.

This year's National Metal Congress sponsored by the American Society for Metals (ASM) is dignified and strengthened by the participation of three other outstanding engineering societies associated in the field of materials—the American Welding Society (AWS), the Wire Association, and the American Institute of Mining and Metallurgical Engineers (AIMME).

Beyond a doubt one of the sparkling high spots of the Congress will be the AWS banquet on Oct. 20. Principal speaker is W. J. Cameron of the Ford Motor Co., known to millions as the voice of the Ford Sunday Evening Hour.

The supporting programs of the four technical societies comprise a group of almost 150 papers and special lectures, according to the tentative program issued before the meeting opened. Each organization will carry on its program, independently, offering a signal opportunity for attendance at the session of most interest.

While the sum total of the program is far too wide in scope to permit even a mention of papers by title, we have selected just a few high spots which appear to have more than passing interest to automotive men. Unless we miss our guess, the educational lecture by Hans Ernst of the Cincinnati Milling Machine Co., scheduled for the opening day's proceedings of the ASM should mark another milestone in the advancement of the art of metal cutting. Although men have cut metal for many years, even today very little is known about the intimate details of the process, and production men, particularly, should profit by the research work undertaken by Mr. Hans Ernst and his

(Right) George B. Waterhouse, president of the A.S.M. is professor of metallurgy at the Massachusetts Institute of Technology.

(Below) William H. Eisenman is the A.S.M. secretary as well as manager of the exposition.

associates in furthering our knowledge of what actually occurs when metal is cut.

An educational lecture the following day takes up the problems of machinability of tool steels by A. B. D'Arcambal and W. E. Bancroft of the Pratt & Whitney Co. The program of the ASM is concluded with an educational lecture on Friday by H. P. Croft, Chase Brass and Copper Co., on the timely subject of "Machining Non-Ferrous Materials."

W. E. Bancroft collaborated with A. H. D'Arcambal, of the Pratt & Whitney Co., in a paper on the problems of the machinability of tool steels.

Opening session of the AIMME is headlined by the Autumn Lecture contributed by the British Institute of Metals, "Gases and Metals," by Colin J. Smithells, General Electric Co. (England). On Wednesday evening the AIMME presents its Physics of Metals round table on the subject of "The Nature of Hardness."

Because of the growing importance of welding as a basic production process, engineers and production men alike will find it profitable to attend certain selected sessions of the AWS. A few high spots are noted here:

"Quality and Efficiency in Oxygen Cutting," by George M. Deming, Air Reduction Sales Co., is self-explanatory by title. Two papers—"Recent Developments in Welding Machine Tool Structures," by L. F. Nenninger and W. A. Maddox, Cincinnati Milling Machine Co.; and "Welding and Cutting in Machinery Construction," by J. Gordon, Taylor-Winfield Corp., have an important bearing on the growing practice of fabricating large machine tool structures from steel plate by welding. That the new technique has definitely come of age is evidenced by beauty of line, the simplicity of design, and greatly lowered costs of machine elements thus produced.

Two automotive sessions, scheduled by the AWS will certainly share the spotlight of Congress offerings. A list of the papers in this group is given by title. "Flame Hardening with the Oxy-Acetylene Flame," by H. J. Sheppard, Kelsey-Hayes Wheel Co.; "Automobile Body Welding," by E. H. Foss, The Murray Corp. of America; "Welding of Rear Axle Housings," by E. L. Bailey and V. Knecht, Chrysler Corp.; "Resistance Welding in the Automotive Industry," by A. DiGiulio, Ford Motor Co.; "Automatic Carbon Arc Welding in the Automotive Industry," by F. M. Maichle, The Lincoln Electric Co.; "Use of Welding in Reconditioning Used Cars," by T. W. Moss, Chrysler Motors Corp. Service.

Some high spots of the sessions of The Wire Association will be found in the following papers—"Resilience of Spring Materials," by R. R. Tatnal, Wickwire-Spencer Steel Co.; "Metallurgy of Steel Wire," by B. L. McCarthy, of the same company; "Stainless Steel Wire," by J. K. Findley, Ludlum Steel Co.

"Some Factors Affecting the Machinability of Cast Steel, Cast Iron, and Malleable Iron" is subject of a lecture by J. W. Bolton of the Lunkenheimer Co.

Hans Ernst, of the Cincinnati Milling Machine Co., speaks on the "Physics of Cutting".

Much in the fashion of a five-ring circus, the Congress, with its four technical society programs, will have plenty of competition from the Exposition, which has been designed to provide visitors with practical information on the treatment and application of modern materials. In addition to displays of materials there are exhibits of metal cutting machinery, cutting tools, testing machines and testing devices of every description, heat treating equipment, temperature controllers and recorders, etc., etc.

Since it is quite impossible to run the gamut of what may be seen at the Exposition, we have made an approach by providing thumbnail sketches of many exhibits in a later section of this article. Even this high-spotting should whet the appetite of every forward-looking engineer and metallurgist.

Developments of the past few years, and even the events of the past few months, presage an exciting adventure in product design influenced by modern materials. To our mind one of the most important lessons to be gained from a visit to the Exposition is the unfolding of the drama of intense but nonetheless benign competition of the various types of materials. We can give you several examples. Here, for example, is the competition between stampings and drop forgings evidenced by the increased number of passenger car parts which have been changed from forgings to stampings this year.

Growing competition has put the drop forging industry on its mettle. With the formation of the Drop Forging Institute several years ago, the industry has been making rapid strides through constructive developments not only in materials, but in forging practice, heat treatment, and quality control. Significant example of these advances is the production of the crankshaft for the new Oldsmobile Series 60 six-cylinder engine, which has an exceptionally low forging cost due to the adoption of the most simplified practice known today.

Exhibitors at the National Metal Exposition

Revised to October 11, 1938

Acme Steel Co.
Aetna-Standard Engineering Co.
Air Reduction Sales Co.
Ajax Electrothermic Corp.
Ajax Electric Co., Inc.
Ajax Metal Co.
Allegheny Steel Co.
Allen Steel Co., Edgar
Alox Corp.
Aluminum Co. of America
American Brass Co.
American Bridge Co.
American Car & Foundry Co.
American Chain & Cable Co.
American Coach & Body
American Cyanamid & Chemical Corp.
American Electric Furnace Co.
American Foundry Equipment Co.
American Gas Association
American Gas Furnace Co.
American Institute of Mining & Metallurgical Engineers
American Machine & Metals, Inc.
American Machinist
American Manganese Steel Co.
American Metal Market
American Rolling Mill Co.
American Screw Co.
American Steel & Wire Co.
American Welding Society
Ampco Metal, Inc.
Anderson & Sons
Arcos Corp.
Armstrong Blum Mfg. Co.
Armstrong Cork Products Co.
Atlas Foundry Co.
Audubon Wire Cloth Corp.
Automatic Gasflux, Inc.
Automotive Industries

Babcock & Wilcox Co.
Baldwin-Southwark Corp.
Barnes Co., Inc., W. O.
Barrett-Cravens Co.
Bastian-Blessing Co.
Bausch & Lomb Optical Co.
Bellis Heat Treating Co.
Bethlehem Steel Co.
Binks Mfg. Co.
Black & Decker Mfg. Co.
Blakeslee & Co., G. S.
Botfield Refractories Co.
Boyer-Campbell Co.
Bradley Washfountain Co.
Braeburn Alloy Steel Corp.
Bright Nickel Co.
Bristol Co.
Brown Instrument Co.
Buehler, A. I.

Campbell, Andrew C.
Carboloy Co., Inc.
Carborundum Co.
Carnegie-Illinois Steel Co.
Carpenter Steel Co.
Chapman Valve Mfg. Co.
Chase Brass & Copper Co.
Chilton Co.
Clemson Bros.
Climax Molybdenum Co.
Columbia Steel Co.
Columbia Tool Steel Co.
Continental Industrial Engineers
Compressed Industrial Gases
Continental Machine Specialties
Crucible Steel Co. of America
Cyclone Fence Co.
Crown Rheostat & Supply Co.

Dayton Rogers Mfg. Co.
Darwin & Milner
de Sanno, A. P.
Despatch Oven Co.
Detroit Rex Products Co.
Detroit Testing Machine Co.
Diamond Iron Works
Dietert Co., Harry W.
Dow Chemical Co.
Driver-Harris Co.
du Pont de Nemours & Co., E. I.
Grasselli Division
R & H Chemicals Department

Eaton Mfg. Co.
Eberbach & Son Co., Inc.
Eclipse Fuel Engineering Co.
Ecco High Frequency Corp.
Electric Furnace Co.
Electro Alloys Co.
Electro Metallurgical Co.
Electronic Control Corp.
Ensign-Reynolds, Inc.

Federal Machine & Welder
Finkl & Sons Co., A.
Firth Sterling Steel Co.
Ford Sales Co., J. B.
Foxboro Co.
Fitzsimons Co.

Gathmann Engineering Co.
General Alloys Co.
General Electric Co.
General Electric X-Ray Corp.
Globar Division of Carborundum Co.
Gogan Machine Corp.
Gordon Co., Claud S.
Great Lakes Steel Corp.

Halcomb Steel Co.
Handy & Harman
Hauck Mfg. Co.
Hayes, Inc., C. I.
Haynes-Stellite Co.
Heat Treating & Forging
Heppenstall Co.
Hevi Duty Electric Co.
Hobart Brothers Co.
Holden Co., A. F.
Hollup Corp.
Hones, Inc., Charles A.
Hoskins Mfg. Co.
Houghton & Co., E. F.

Illinois Testing Labs., Inc.
Illinois Tool
Industrial Heating
Industrial Heating Equipment Co.
Industry & Welding
Industrial Publishing Co.
International Nickel Co., Inc.
Iron Age.

Jackson Electrode Holder Co.
Jessop Steel Co.
Johns-Manville
Jones & Laughlin Steel Corp.

Kelley Co., J. W.
Kellogg Co., M. W.
Kemp Mfg. Co., C. M.
Krembs & Co.
Krouse Fatigue Testing Mach. Co.

LaSalle Steel Co.
Latrobe Electric Steel Co.
Lava Crucible Co.
Leeds & Northrup Co.
Leitz, Inc., E.
Lepel High Frequency Labs.
Lima Armature Works
Lincoln Electric Co.
Lindberg Engineering Co.
Linde Air Products Co.
Ludlum Steel Co.

Machinery
Macklin Co.
Maehler Co., Paul
Magnaflux Corp.
Magnetic Analysis Corp.
Mahr Mfg. Co.
Mallory & Co., Inc., P. R.
Manganese Steel Forge Co.
Manhattan Rubber Mfg. Co.
Marburg Brothers, Inc.
Marquette Mfg. Co.
Maurath, Inc.
McGraw-Hill
McKay Co.
Metal Cleaning & Finishing
Metal Industry
Metal & Thermit Corp.
Metals & Alloys
Metals Disintegrating Co.
Michiana Products Corp.
Michigan Steel Casting Co.
Midvale Co.
Milne Co., A.
Modern Machine Shop
Molybdenum Corp. of America
Monarch Steel Co.

National Cylinder Gas Co.
National Electric Welding Machines Co.
National Industrial Publishing Co.
National Tube Co.
New Jersey Zinc Sales Co.
Norton Co.

Oakite Products, Inc.
Ohio Crankshaft Co.
Ohio Steel Foundry Co.
Olsen Testing Machine Co., Tinius

Page Steel & Wire Co.
Pangborn Corp.
Park Chemical Co.
Parker-Kalon Corp.
Parker Rust Proof Co.
Partlow Corp.
Penton Publishing Co.
Production Machine Co.
Products Finishing
Pyro Electric Instrument Co.
Pyrometer Instrument Co.

Quigley Co., Inc.

Ready Power Co.
Reeves Pulley Co.
Reinhold Publishing
Republic Steel Corp.
Robinson Welding Supply Co.
Rath Welding & Engineering
Rustless Iron & Steel Corp.
Ryerson & Son, Inc., Joseph T.

Scherr Co., Inc., George
Scully Steel Products Co.
Selas Co.
Sentry Co.
Shakeproof Lock Washer
Sleeper & Hartley, Inc.
Spencer Turbine Co.
Steel
Steel Publications
Steel City Testing Labs.
Stirling-Detroit Corp.
Stuart & Co., D. A.
Super Tool Co.
Surface Combustion Corp.

Tagliabue Mfg. Co.
Taylor-Winfield Corp.
Tennessee Coal, Iron & Ry. Co.
Thermit Corp.
Thomas Steel Co.
Thompson & Son Co., Henry G.
Tide Water Associated Oil Co.
Titanium Alloy Mfg. Co.
Torrington Mfg. Co.

Una Welding, Inc.
Union Carbide Co.
Unitcast Corp.
United States Steel Corp.
Universal - Cyclops Steel Corp.
Universal High Speed Tool Co.

Vanadium Corp. of America
Victor Saw Works, Inc.
Vulcan Crucible Co.

Wall Colmonoy Corp.
Welding Engineer
Wells Mfg. Corp.
Westinghouse Electric & Mfg. Co.
Wheelco Instrument Co.
Wilcox, Rich
Wilson Co., H. A.
Wilson Mechanical Instrument Co.
Wire Association

Youngstown Sheet & Tube Co.

Zeiss, Inc., Carl
Zir Steel & Wire Co.

THE CHILTON ROUND TABLE

In order to give readers of AUTOMOTIVE INDUSTRIES a clue to certain merchandising and service aspects of the automotive industry which are normally outside the scope of an industrial publication, we present herewith excerpts from the October issues of the four other magazines published by the Automotive Division of the Chilton Co.

FROM AUTOMOBILE TRADE JOURNAL

There could be no grounds for public reaction against a law in all States which would require the abandoning of the use of a car on the highways if it is not maintained in a safe operating condition. Nation-wide application of such State laws would dissipate our used car problem.

FROM COMMERCIAL CAR JOURNAL

The time has come for politicians to realize that railroad trainmen are no longer the only organized labor group in the field of transportation. Unionization within the field of highway transportation has brought with it the dawn of a new era—politically speaking.

FROM MOTOR AGE

During comparatively recent years the development of automotive service work has tremendously increased the number of wrenches in everyday use. But today in most catalogs the single head, open-end engineers wrench for a hexagon nut on a half-inch U. S. Standard bolt will be found listed as No. 5. The reason?—

FROM MOTOR WORLD WHOLESALE

Some of the new developments that have come about as the result of engineering changes in motor vehicles can be attributed directly to changed economic and business conditions while others represent improvements in servicing and maintenance technique but all of them refute the theory that automotive jobbing has seen its best days.

Then we have the very light metals crowding closely on the heels of conventional construction. Strong alloys of aluminum are finding wide use in the construction of large structures such as truck and trailer bodies and on bus bodies, as in the case of the entire line of White buses. For this purpose the industry uses not only sheets, but all manner of structural shapes. Magnesium alloys, even lighter than aluminum have been used for many years in aircraft engine construction, and their use is being rapidly expanded in other directions.

One of the most significant developments along this line is the recent entry of the Bohn Aluminum and Brass Corp., with a family of Magalloy—magnesium alloy—metals. The material is 2/3 the weight of aluminum and can be produced in heat-treatable alloys possessing unusual physical strength. Bohn is grooming the family of Magalloy metals for the production of strong but light-weight hand tools as well as for various kinds of products.

It is significant that steel technologists have not conceded a victory to the light-weight metals in the construction of large automotive structures. High tensile stainless steels, extremely strong and yet light in section, have found wide application on high-speed trains, on truck and truck-trailer bodies, etc. Latest trick is the wide-spreading adoption of the so-called "low alloy" sheets and shapes for truck and trailer bodies. These materials, produced by a number of different steel mills under characteristic trade names, such as Yoloy, for example, have so much higher tensile properties than ordinary carbon steels that the deadweight of the structures can be reduced from 25 to 50 per cent without sacrificing the factor of safety.

H. B. Knowlton of the International Harvester Co., presents a paper on Machinability of Ingot Iron, Wrought Iron, SAE Steels and Stainless Steels.

A. H. D'Arcambal with W. E. Bancroft of Pratt & Whitney Co. prepared a paper on the machining of tool steels.

Nickel alloy steels and cast irons containing nickel are widely used, not only because of superior strength and other unique properties such as resistance to corrosion and high temperatures for certain types of alloys, but also for the unusual ease of machinability despite the extreme surface hardness required in some of the alloys. The International Nickel Co. will show at the Exposition its new material—Z-nickel, a heat treatable alloy of almost pure nickel whose automotive applications are still to be explored.

Speaking of machinability, production men are vitally interested in the free machining metals available today. Here, for example, are the free-machining stainless steel alloys such as are produced by Bethlehem, by Carpenter, and by others. Then there are the free-machining Bessemer screw steels, such as are produced by Bethlehem, the Uma treated steels by Union Drawn Steel, etc. Fitting

directly into the picture is Ledloy, a new free-machining steel developed by the Inland Steel Co.

Reverting for the moment to the competition of different metals, consider the progress made by the high-purity alloys of zinc such as the Zamak series produced by the New Jersey Zinc Co. The modern alloys of high-purity zinc, possessing excellent physical properties, have spread widely in their application in automotive products of every description —for radiator grilles, for hardware and ornaments, for large and small parts and accessories where the die casting technique lends itself so admirably to the requirements of intricate coring with the very minimum of machining.

Perhaps one of the most striking developments in the materials field is that of the extremely wide sheets for body panels, endowed with elastic properties undreamed of but a few years ago. The present styling trends owe much of their practicability and surprisingly low cost to the ease with which the sheet metal can be stretched and formed to produce the huge one-piece fenders and large body panels.

H. P. Croft of the Chase Brass and Copper Co., talks on the machining of Nonferrous Materials both cast and wrought.

Short-cycle malleable iron has become a boon to engineers and factory men. Costs have been reduced so sharply, despite improved quality, that malleable irons are beginning to find more expression in 1939 motor cars. Too, there is the development of pearlitic malleable irons for many applications, one of which is the rocker arm casting for the new Buick engines, replacing the drop forgings used formerly. Another striking malleable iron application is the malleable iron camshaft adopted this year by Packard. This shaft is Tocco-hardened.

Pyrometry is the subject of a talk by R. B. Sosman from the Research Laboratories of the United States Steel Corp.

Welding in all of its ramifications is decidedly linked with the future of motor car development. The oxy-acetylene torch, the electric arc, resistance welding of every type—all have been impressed in their own unique field of application. One of the most promising applications of resistance welding is the one based on the Hart patents, promoted by Steel and Tubes, Inc., in the production of all-tubular integral body and frame construction for motor car bodies, for truck bodies, for bus structures, etc.

While on the subject of resistance welding, it is important to note the outstanding contributions of the P. R. Mallory & Co., one of the most prominent producers of welding electrodes and electrode materials. At the Exposition, in addition to the family of alloys with which welding men already are familiar, Mallory will exhibit a new material—Elkon bronze, a low-priced material intended particularly for current-carrying castings used in welding machines and fixtures. This material has high-strength and relatively high conductivity compared with the conventional aluminum bronzes and manganese bronzes which it is intended to replace.

No discussion of metals of construction could be complete without some brief reference to cutting tools. Perhaps the most epoch-making discovery in this field was that of the cemented-carbides, which first saw the light of day about ten years ago. Since that time cemented-carbides of various types not only have revolutionized metal cutting techniques, but have wrought a revolution in the design of machine tools. This development will be emphasized at the Exposition by the Carboloy Co., which, in cooperation with some 80 allied organizations, will display Carboloy-tipped tools of every description together with examples of well-known machine tools designed to use such tools to the best advantage.

One of the other exhibits of the same nature is planned by the Haynes-Stellite Co., illustrating the utility of metal cutting tools of various types tipped with well-known hard cutting materials produced by this company.

Needless to say, the array of ferrous and non-ferrous metals constitutes but a part of the materials picture. Equally important advances have been made in other fields. Plastics are invading automotive design in the shape of large, intricate castings as well as for ornamentation. Remarkable strides have been made in molded rubber for mechanical applications—witness the work of Dry-

The Edward De Mille Campbell Memorial lecture is given by A. L. Boegehold of the General Motors Research laboratories.

den Rubber Co., Firestone, Goodyear, U. S. Rubber Co., and others. One of the prominent motor car producers will feature the first use of a patented seat cushion construction in which the conventional spring cushion will be supplemented by an upper section of Latex-foam cushion, coordinating to produce a marvelous seat and ride.

Synthetic finishes for motor cars, first used in fine car production on the Lincoln-Zephyr, are being extended wider than most people realize. Ditzler Color, for example, has developed a line of finishes which will enhance the beauty of the entire line of Chrysler Corp. cars. DuPont was one of earlier producers of synthetic finishes of the type now being used so widely.

We could go on almost indefinitely touching the high spots of the materials basic to the development of better automotive products. We hope that the foregoing will be sufficient to impress automotive men, no matter what their interests, with the necessity for spending at least some time at Convention Hall. The experience should prove to be a revelation and a liberal education indeed.

Of Automotive Interest—

Acme Steel Co., Chicago.
Exhibiting (in operation): The complete line of Acme Superstrip, including hot and cold rolled as well as stainless and galvanized. Of particular interest is exhibit of strip steel in colors and with rolled-in designs. A new development is an electro galvanized strip steel with a permanent bright lustrous finish.

Air Reduction Sales Co., New York.
Representative group of flame cutting machines. Their range extends from the cutting of lightest gauge steel plate to steel slabs, forgings and castings approaching 30 inches in thickness. They cut in straight lines or in intricate contours, either vertical to the surface or at an angle.

The No. 20 Travograph, No. 1 Omnigraph, No. 4 Radiagraph and the new No. 10 Radiagraph will be displayed and demonstrated. In addition to these representative demonstrations of mechanical gas cutting, Flame Hardening with the oxyacetylene torch will be demonstrated; hard facing with Stoody products, Aircobrazing of Walseal fittings and the use of the new low temperature brazing alloy—Sil-Fos—will also be demonstrated.

Wilson arc welding machines will be displayed.

Alox Corporation, Niagara Falls, N. Y.
Exhibiting (in operation): Various types of anticorrosion products, applicable to ferrous, nonferrous and alloy metal protection.

Ajax Electric Co., Inc., Philadelphia.
Exhibiting (in operation): Ajax-Hultgren Salt bath furnace in operation, demonstrating the use of this furnace for carburizing, cyaniding, scale free hardening, tempering, annealing, and hardening high speed steel tools.

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Exhibiting: Display of Allegheny Metal and an educational section showing the fabrication of Allegheny Stainless Steels, examples of welding with test samples as well as examples of spinning, drawing and machining.

Allegheny Ludlum Steel Corp., Watervliet, N. Y.
Exhibiting: Tool steels; Nitralloy; FCC products.

Aluminum Company of America, Pittsburgh.
Exhibiting (in operation): Display of the commercial forms of aluminum used by the metal-working trade, including examples of products built principally of aluminum parts.

The American Brass Co., Waterbury, Conn.
Exhibiting (in operation): Anaconda copper and copper alloy welding rods. Demonstration of both electric and oxyacetylene welding. Displays of alloys, such as the high strength engineering alloy Everdur Silicon-Copper, Avialite, the copper aluminum alloy used for valve seats, guides and spark plug bushings in aeroplane and other internal combustion engines and Anaconda Beryllium-Copper, the new high strength heat treatable copper-rich alloy.

American Cyanamid & Chemical Corp., New York.
Exhibiting (in operation): A pot demonstrating the use of the new carburizing materials Aerocarb A and Aerocarb B.

The American Foundry Equipment Co., Mishawaka, Ind.
Exhibiting (in operation): No. 1 Wheelabrator Multi-Tablast, an airless abrasive blasting machine, designed for cleaning flat, fragile or thin-section pieces such as castings, forgings, or stampings.

American Gas Furnace Co., Elizabeth, N. J.
Exhibiting (in operation): 1. The latest high speed oven furnaces with bottom vent and vent closures and atmosphere adjusting burners automatically actuated by the door mechanism. 2. A reciprocating full muffle continuous heating machine for clean hardening with whatever gaseous atmosphere may be desired. 3. An improved pot hardening furnace with latest type lining and insulation, numerous small burners for uniform heating and quiet operation distributed about the upper part of the furnace which is arranged with down draft. 4. A newly improved oven furnace which is especially adapted for use in the tool room. This furnace is extremely versatile and lends itself readily for hardening, annealing, carburizing and tempering. 5. A burner type heating machine of high capacity which is especially adapted for localized hardening and annealing.

American Rolling Mill Co., Middletown, O.
Exhibiting: Formed pieces showing the workability and other qualities of special grades of iron and steel are a feature of the exhibit. Some of the flat-rolled metals shown are Armco Ingot Iron, Armco Stainless Steel, Armco Zincgrip, Armco Galvanized Paintgrip, Armco H. T. -50, Armco enamelling iron and Armco cold-rolled steel. Also Armco Zincgrip, a new galvanized sheet metal, supplied in sheets or coils. This material withstands severe forming and moderate drawing successfully.

American Screw Co., Providence, R. I.
Exhibiting (in operation): A demonstration of the many advantages of the American Plus Phillips Screws.

American Steel & Wire Co., Cleveland, (United States Steel Corporation Subsidiary).
Exhibiting: Wire and rods of all types; stainless and cold finished strip; detailed exposition of the austempering process and products so treated.

Ampco Metal, Inc., Milwaukee.
Exhibiting: Casting and fully machined parts of the various grades of Ampco Metal. Samples and data pertaining to Ampco's service on guide bushings, wear strips, pickling equipment, welding dies, maintenance alloys, and safety tools.

Arcos Corp., Philadelphia.
Exhibiting: Stainless steel electrodes; heat resisting chromium-nickel electrodes; low chromium alloy electrodes; bronze electrodes; aluminum electrodes; nickel electrodes; manganese electrodes; cast iron electrodes; car-end electrodes; methods of testing alloy weld deposit.

Armstrong Cork Products, Lancaster, Pa.
Exhibiting (in operation): Armstrong's insulating fire brick for all types of heated equipment; cements for laying and facing insulating fire brick; Monolithic Cement; Coprtex High Temperature Block and Coprtex Heat Insulating Cement.

Baldwin-Southwark Corp., Eddystone, Pa.
Exhibiting (in operation): A 6000 lb. Southwark Tate-Emery universal testing machine; a Southwark type 5-50 universal testing machine; a R. R. Moore fatigue testing machine; a Carpenter torsion impact testing machine; a 1000 lb. Bernhard oscillator; a Rayflex fatigue testing machine; a Morehouse proving ring; and various types of De Forest strain gages.

Barrett-Cravens Co., Chicago.
Exhibiting: Hand lift trucks; tin plate trucks; portable elevators, hand and electric operated. Nifty Lifter System material handling equipment.

The Bastian Blessing Co., Chicago.
Exhibiting (in operation): Mass production welding of small parts. Display includes Rego gas manifolds, Rego welding and cutting apparatus, economizers, air regulators, cylinder valves, liquefied petroleum gas apparatus.

Bausch & Lomb Optical Co., Rochester. N. Y.
Exhibiting (in operation): Large research type metallographic equipment for bright field, dark field and polarized light; large standard metallographic equipment; routine metallographic equipment; new contour measuring projector; Ortho-Stereo camera and Ortho stereoscope; Petrographic microscope; Brinell microscopes; wide field binocular microscopes; spectrum measuring microscope; and dust counter.

Bethlehem Steel Co., Bethlehem, Pa.
Exhibiting (in operation): 1. turret top, fenders and other deep drawn parts. Will feature views of the key operations in the continuous strip mill. Coils of 72 in. strip will be shown. 2. Mayari R high-tensile, low-alloy steel. Typical applications in the automotive field. 3. Model of 25 ton furnace for alloy steels.

Binks Manufacturing Co., Chicago.
Exhibiting (in operation): Spray painting equipment for finishing all types of metals; water cooling towers used in the heat treating of metals.

Blakeslee & Co., G. S., Cicero, Ill.
Exhibiting (in operation): Solvent and degreasing machines and a Niagara metal parts washer, which cover the two most popular and up-to-date methods of metal cleaning. A new improved Model R degreaser equipped with the water separator in operation. A model degreaser made of glass operating to show the principles of the Blakeslee solvent degreasing process. Blakeslee Co. popular LLV or three tank solvent degreaser, having the economical Dual-Vapor-Control system.

The Boyer-Campbell Co., Detroit.

Exhibiting: Showing for the first time a new novel line of face protection for such operations as spot-welding, metal band sawing, disc sanding, wire brush operations, hammermen, acid handlers, and similar operations.

The Bristol Co., Waterbury, Conn.

Exhibiting (in operation): Bristol's Pyromaster Potentiometer and applications in the metals industries. Air-operated and electric controllers in operation to demonstrate the value of these instruments in providing for extremely close temperature control in electric and fuel-fired furnaces and ovens.

A new electronic controller shown for the first time. It is extremely accurate and provides for long life of the vacuum tube and relay used.

Bristol's Ardometer Radiation Pyrometer and Bristol's Pyrotrol, for protecting gas-fired ovens against explosions. A low-range draft controller and an air-fuel ratio controller.

The Brown Instrument Co., Division of Minneapolis-Honeywell Regulator Co., Philadelphia.

Exhibiting (in operation): Indicating, recording, controlling instruments and auxiliary equipment used in the production, fabrication and heat treatment of both ferrous and non-ferrous metals. These will include electrically and pneumatically operated thermometers for die-casting machines, ovens, tempering tanks and other services up to 1200° F.—also electrically and pneumatically operated control potentiometers for use with thermocouples or radiation pyrometers for hardening, brazing and annealing furnaces or other services up to 3400° F.

The following instruments are being exhibited: Brown Analy-Graph: Self-contained system for analyzing and measuring furnace atmospheres; The Brown Multiple-Recording and Controlling Potentiometer Pyrometer: the newly developed Brown Multiple-Recording Potentiometer Pyrometer, operating on the balanced Wheatstone bridge principle. Where it is desirable to record several temperatures on one chart, this instrument makes it possible to record and control from two to six temperatures from as many different thermocouples. The Brown Radiomatic Pyrometer: a new line of recently improved radiation pyrometers for measuring the temperature of open hearth roofs or temperatures inside of hydrogen brazing furnaces; the Brown Air-o-Line Potentiometer: For automatic temperature control of continuous furnaces as encountered in steel mill practice; the Brown Furnace Pressure Controller: maintains the pressure inside the furnace constant at a predetermined value by means of automatically operated dampers that regulate the flow of gases from the furnace.

Andrew C. Campbell Division, American Chain & Cable Company, Inc., Bridgeport, Conn.

Exhibiting (in operation): Cut-Off Machines Nos. 213 and 302 as well as No. 401 Cutamatic. These machines cut materials such as alloy steels, non-ferrous alloys, plastics and many other materials.

Carboloy Co., Inc., Detroit.

Exhibiting: Approximately 80 leading tool manufacturers and machine tool builders are cooperating with Carboloy Company to display representative samples of all types of tools now tipped with cemented carbide as well as the latest types of machines designed for use with Carboloy. Included in the tool section will be shell type and chucking reamers, drills for glass, concrete, cast iron, and non-ferrous metals, counterbores, multiple cutter boring heads, boring bars, precision boring tools, saws, hollow mills, face mills, half-side mills, plug gages, snap gages, thread gages, etc. The machine tool section will consist of a pictorial presentation of the most up-to-date machines designed for maximum use of Carboloy tools.

Other features include displays of the Carboloy manufacturing process. Diamond-Impregnated Carboloy wheel dressers, the new bench type Carboloy tool grinder, and an extensive display of wire and tube products produced through Carboloy dies.

The Carborundum Co., Niagara Falls, N. Y.

Exhibiting: A complete line of grinding wheels for both snagging and precision grinding as well as tool room, cut-off, roll grinding, crank and cam shaft and diamond wheels. Abrasive paper and cloth will also be exhibited and polishing grain.

The Carborundum Co., Refractory Division, Perth Amboy, N. J.

Exhibiting (in operation): Small electric furnace showing conductivity of various refractories. Also exhibit of refractories for various heat treating furnace applications.

Carnegie-Illinois Steel Corp., Pittsburgh (United States Steel Corporation Subsidiary).

Exhibiting: Sample sections of high-tensile, corrosion-resistant Cor-Ten, Man-Ten, and stainless steels; sheets showing available grades and finishes; new data on hardenability, slag-control, and other metallurgical tests; movie, "Cor-Ten, Its Manufacture and Uses"; structural shapes, flats, rounds and bars, in carbon and alloy grades.

Carpenter Steel Co., Reading, Pa.

Exhibiting: The new Carpenter matched-tool steels. A method for controlling the atmosphere in a fuel fired furnace is demonstrated.

Chase Brass & Copper Co., Waterbury, Conn.

Exhibiting (in operation): Examples of welded and fabricated products of Chase brass, copper and bronze. Actual demonstrations of welding copper and Olympic bronze. All types of difficult welds—butt welds, fillet welds and lap welds—on copper, bronze and steel.

Chilton Co. (Automotive Industries), Philadelphia.

Exhibiting: Automotive business publications.

Columbia Tool Steel Co., Chicago Heights, Ill.

Specimens and full information on Clarite High Speed, Vanite High Speed, Molyite High Speed, Maxite Super High Speed, Superdie High-Carbon, High-Chromium, Oildie Non-Deforming, Exl-Die Non-Deforming, Buster Alloy Punch and Chisel, Special, Extra Vanadium, Extra, Waterdie, Standard Vanadium, and Standard Tool Steel.

Continental Industrial Engineers, Inc., Chicago.

Exhibiting (in operation): Continental recirculating annealer; Continental heat treat machine; Continental muffleless gas carburizer (continuous).

C own Rheostat & Supply Co., Chicago.

Exhibiting (in operation): New variable speed polishing lathe; new type of work holding heads for polishing; plating barrel; drying unit; rheostat.

Detroit Rex Products Co., Detroit.

Exhibiting: 2-dip degreaser, electrically heated, used in removing oil and grease from metal parts.

Animated display of pictures, showing machine designs and installations, using Perm-A-Clor Safety Solvent. Illustration of Special Can-Cleaning Degreaser.

Samples of Triad Alkali Cleaners for use prior to plating, enameling, on screw machine work, stripping of enamel.

Detroit Testing Machine Co., Detroit.

Exhibiting (in operation): Hardness testers; new direct reading Brinell machine; new special direct reading Brinell for tubes, pipes or other compressible members; ductility or sheet metal testers; Universal testing machines.

A. P. de Sanno and Son, Inc., Philadelphia.

Exhibiting (in operation): Radiac Cut-Off Machine Type "K" cutting by the abrasive wheel method both wet and dry metals and other materials. Type "F" Radiac Bench Machine cutting various materials with an abrasive disc dry cutting. Type "C" Radiac Cut-Off Machine cutting various materials with an abrasive disc dry cutting.

Harry W. Dietert Co., Detroit.

Exhibiting (in operation): Complete line of spectrographic equipment for qualitative and quantitative analysis of all metals, ores, and paints. Two minute carbon determinator and five minute sulphur determinator in operation analyzing carbon and sulphur content of various metals. Sand testing equipment for moisture, permeability and strength in operation.

The Dow Chemical Co., Midland, Mich.

Exhibiting: Various manufactured products in which Dowmetal is used either entirely or in part; a miscellaneous assortment of Dowmetal sand and die castings, extruded shapes, sheet and plate.

Driver-Harris Co., Harrison, New Jersey.

Exhibiting: The following types of castings: Roller Rail and Roller—The roller turns on a small shaft instead of on the trunnions, thus preventing dirt or scale from getting on the wearing surfaces and at all times allowing greater freedom for rotation. With no increase in weight or size this design will support about twice the load of the trunnion design. Patent has been applied for.

"Cantilever" Tray—A radical departure from the conventional tray design and has already proven its economy and durability in a number of the more severe atmosphere furnace applications.

Work Support Fixture—A unique type of fixture for use in supporting work in "Vertical" furnaces. Its flexibility permits the loading or stacking of work that is not possible with the usual type of fixture.

Malleableizing Basket—A complete new design comprising tray, liner sides, ends, etc., that permits assembly and disassembly with little effort.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Exhibiting (in operation): Chemicals for heat treating steels, and other chemicals and processes for modern metal finishing. An electroplating unit demonstrating new process recently developed.

Eclipse Fuel Engineering Co., Rockford, Ill.

Exhibiting (in operation): Eclipse gas fired Rotair air draw furnace; Eclipse gas fired oven furnace; Eclipse gas fired pot furnace; Eclipse gas fired high speed steel furnace; McKee tunnel burners; McKee pressure blowers; McKee cycle lighter; McKee automatic air-gas proportioning equipment; McKee automatic air control valves.

The Electric Furnace Co., Salem, O.

Exhibit includes photographs of outstanding electric, oil and gas fired furnaces built for normalizing, carburizing, short cycle malleableizing, nitriding, forging, annealing and other heat treating processes, also pictures of gas fired radiant tube furnaces, Elfurno special atmosphere generators, etc.

The Electro-Alloys Co., Elyria, O.

Exhibiting: Heat and corrosion resistant castings such as muffles, retorts, molten liquid containers, carburizing boxes, furnace parts, and the inspection methods employed.

Electronic Control Corp., Detroit.

Exhibiting (in operation): A model Clearing press with curtain of light safety control; modern and approved curtain of light projector and receiver; radically new type of temperature control; and other varying Electronic equipment for inspection, grading and sorting.

Firth-Sterling Steel Co., McKeesport, Pa.

Exhibiting (in operation): The display includes all types of Firth-Sterling Stainless steels, Globe Drill rods and wire. Firth-Sterling tool steels, die steels. Many types of Firthite Cutting Tools, and many non-standard Firthite tools of very recent design. Several types of Firthaloy wire drawing dies, tube drawing dies, etc.

The J. B. Ford Sales Co., Wyandotte, Mich.
Exhibiting: Complete display of Wyandotte specialized metal cleaners for plating, lacquering, enameling, japanning, and vitreous enameling. For use in still solutions, electric cleaning solutions, metal parts, washing machines, tumbling barrels, and spray gun equipment. For cleaning before bonderizing, chromodizing, parkerizing, anodizing, hot tinning, galvanizing, and assembling. For removing lacquer, japan, carbonized mineral oils, and fabricating compounds. Wyandotte burnishing compounds for all burnishing problems. Wyandotte neutralizers for neutralizing acid after pickling operations. Wyandotte specialized cleaners for cleaning railway equipment, aeroplane, and automotive equipment.

General Alloys Co., Boston.
Exhibiting: Nickel - chromium alloys, Q-Alloys; carburizing and annealing containers; cyanide and lead pots, furnace hearths, roller rails, heat and acid resistant chain; cyanide dipping baskets, recuperators, miscellaneous furnace parts, parts for every type heat treating furnace-carburizing, annealing, normalizing, hardening, tempering, forging, spheroidizing, tubes and retorts, corrosion and abrasion resistant castings.

General Electric Co., Schenectady, N. Y.
Exhibiting (in operation): AC and DC welders including several sets of brand new design. Complete line of welding accessories. Comprehensive exhibit of industrial products manufactured through the use of copper brazing, bright annealing, and scale-free hardening—all performed in G-E electric furnaces.

General Electric X-Ray Corp., Chicago.
Exhibiting: The latest oil-immersed, shock-proof industrial X-ray machine.

Handy & Harman, New York.
Exhibit features low temperature brazing. A series of slides will show the brazing process. Many other samples of work done with Sil-Fos, Easy-Flo and Handy Flux will be displayed. Silver clad plate and powdered metals containing silver will also be shown.

C. I. Hayes, Inc., Providence, R. I.
Exhibiting (in operation): Furnaces, "Certain Curtain" type, with atmosphere control for heat treatment of high speed, carbon, alloy, and high carbon, high chrome tool steels.

Hobart Brothers Co., Troy, O.
Exhibiting (in operation): Demonstrating arc welding equipment. A complete line of the new Hobart "Multi-Range" arc welders with continuous demonstrations of such features as "1,000 volt-ampere combinations," remote control, "Motor Horsepower Control," etc. Samples of typical welded joints and other welding applications involving various kinds of ferrous and nonferrous metals.

E. F. Houghton & Co., Philadelphia.
Exhibiting (in operation): Heat treatment salt baths; Houghton's Perliton liquid carburizer which is now in production throughout the metal working plants of the world.
Enlarged photomicrographs showing case structures obtained with Perliton. Samples of production work Perlitonized in various plants, as well as samples of drawing, cutting, etc., with the aid of Houghton metal working products.

Illinois Testing Laboratories, Inc.
Exhibiting (in operation): "Alnor" portable and wall type indicating pyrometers and resistance type thermometers, "Alnor" electronic type temperature controller, instantaneous, direct reading air velocity meter, "Alnor" forewarn metal detector for industrial applications.

International Nickel Co., Inc., New York.
Exhibiting: Twenty-five nickel containing alloys ranging from ½ to 99.95% nickel.

Jackson Electrode Holder Co., Detroit.
Exhibiting: Insulated arc welding electrode holders which protect the welder from shock when holder contacts grounded metal.
Eyeshields for the protection of mechanics working on gas welding, blow torch, gas cutting, spot, gun and spot welding, metal pouring, grinding, chipping and other industrial operations. Light, generously ventilated, non-fogging.

Johns-Manville, New York.
Exhibiting complete line of Johns-Manville Insulations available for use in the metals industry.

Jones & Laughlin Steel Corp., Pittsburgh.
Exhibiting (in operation): A working diorama of a steel mill is being displayed by Jones & Laughlin. Also typical samples and parts illustrating the many uses of carbon steel products, including J & L Strip and Sheets, Cold Finished Bars, Shapes, Shafting and Flats, Hot Rolled Bars, Shapes and Junior Structural Sections, Forging Steel, Spring Wire and Merchant Wire, Galvanized Sheet and many other products.
Notable among the special displays is a first showing of large forgings produced by Jones & Laughlin.

The J. W. Kelley Co., Cleveland.
Exhibiting (in operation): Industrial oils; heat treating products; working display of KelKut transparent grinding oil.

Krouse Testing Machine Co., Columbus, O.
Exhibiting (in operation): Repeated stress testing machines of the following types: High speed, rotating beam, rod and wire, sheet and plate.

E. Leitz, Inc., New York.
Exhibiting (in operation): Large Micro-Metallograph MM-1, latest model, for observation in ordinary incident light, polarized incident light, and dark field. Simplified Micro-Metallograph MM-2, with combination illumination unit arc lamp—incandescent light source. Universal Metallurgical Microscope "Panphot" of most recent design. Dilatometer, automatic magnetic polishing machines, low power stereo binocular microscopes, and various types of microscopical accessories, for metallurgical investigation. Leica Camera and accessories.

The Lincoln Electric Co., Cleveland.
Exhibiting (in operation): Lincoln shield arc welders, electrodes, automatic, supplies; Lincoln Linc-Weld motors; Linconditioner.

Lindberg Engineering Co., Chicago.
Exhibiting (in operation): Cyclone tempering furnaces; Tubulaire Electric furnaces; Lindberg controls; Lindberg throttling control; and Hydryzing process for hardening metals (new development).

Macklin Co., Jackson, Mich.
Exhibiting: Back wall, side wall, miniature swing frame grinder operating display of grinding wheels.

The Paul Maehler Co.
Exhibiting Maehler Air Heaters, Panel Sections.

Magnaflux Corp., Chicago.
Exhibiting (in operation): Magnaflux Method of Inspection as employed in the automotive, aircraft, railroad and welding industries as well as in all general industrial fields.

Mahr Manufacturing Co. Div. of Diamond Iron Works, Inc., Minneapolis.
Exhibiting (in operation): Introducing the Mahr Nitrogen Generator. A standard 100 cu. ft. per hour unit in full operation with auxiliary gas analyzing equipment, demonstrating the uniformity and purity of the generated gas.

P. R. Mallory & Co., Inc., Indianapolis, Ind.
Exhibiting: Complete showing of all types of Mallory electrodes—spot welding tips, seam welding tips, projection welding plugs, butt and flash welding dies—and water-cooled holders. Photographic display of diverse welding operations in automotive industries with performance stories of Mallory electrodes. Samples of many similar and dissimilar metals showing spot welding results obtained. Castings, forgings and finished machined parts of Mallory non-ferrous alloys of high electrical conductivity and great strength. Special displays of Mallory electrical contacts—tungsten, silver, Elkonite and special alloys—and types of apparatus using them. Displays of special parts fabricated by Mallory of tungsten and molybdenum.

Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J.
Exhibiting: Bethlehem Foundry Type Cut-Off Machine cutting gates off stainless steel and bronze castings. Also operating small grinder equipped with special soft rubber finishing wheels.

Marquette Manufacturing Co., Inc., Minneapolis, Minn.
Exhibiting (in operation): The latest development in Marquette A. C. Arc Welders, also a complete display of Marquette and Weldite Arc Welding Electrodes.

Metals Disintegrating Co., Inc., Elizabeth, N. J.
Exhibiting (in operation): Metal Powders: Aluminum, copper, copper flake, lead, tin, zinc, silver, solder, antimony, iron, manganese, molybdenum silicon, titanium, and others. Also, various samples showing some applications of Metal Powders.

Metal & Thermit Corp., New York.
Exhibiting: Ferro alloys, calcium molyb- Electrodes for manual arc welding. Murex Fillex, a new electrode for high-speed fillet welding and other down-hand work, are featured.

Molybdenum Corp. of America, Pittsburgh.
Exhibiting: Ferro alloys, calcium molybdate and metal powders.

National Cylinder Gas Co., Chicago.
Exhibiting (in operation): The National No. 646 oxy-acetylene shape cutting machine. This model of the National has a rectangular cutting range of 6 feet wide by 4½ feet long. It cuts any thickness of plate within the present limits of the cutting torch. It has several exclusive features, resulting in greater production per hour and reduced total cutting costs. New and improved oxy-acetylene apparatus for flame hardening shafts.

National Electric Welding Machines Co., Bay City, Mich.
Exhibiting (in operation): (1) New Style National 200 Series Double Roll Knurl Driven Circular Seam Welder, 150 KVA capacity, together with new style General Electric Seam Welding Thyratron Control Panel. A new style National 100 Series Motor Driven Press Type Projection Welder, 50 KVA capacity together with Westinghouse Weld-O-Trol (new style tube type contactor). A special General Electric One-Half Cycle Thyratron Welder equipped with Special National Bench Type Press Welding Head.

National Tube Co., Pittsburgh, (United States Steel Corporation Subsidiary).
Exhibiting: Seamless and welded tube and tubular products in carbon and alloy grades; tests and test data; examples of applications.

The New Jersey Zinc Co., New York.
Exhibiting: Zinc alloy die castings in the raw and finished state. A wide assortment of finished products in which these castings are used including electrical appliances, business machines, small tools and hardware. A comprehensive group of new and unusual automotive applications of zinc alloy die castings.
A feature is a revolving turret on which is mounted the radiator grilles used by Oldsmobile from 1935 through 1939. These grilles are all die cast and afford an excellent case history. The four main characteristics of zinc alloy die castings—Strength, Accuracy, Complexity, Economy—are dramatized by photograph murals on the back wall of the booth.

Norton Co., Worcester, Mass.
Exhibiting: Abrasives, grinding wheels, rubbing bricks and refractories of the types generally used by the steel industry. New

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Lincoln-Zephyr

adopts hydraulic brakes for 1939 line of six body styles

REFINEMENTS in styling, increased passenger comfort, and a number of mechanical improvements including hydraulic brakes are features of the Lincoln-Zephyr for 1939. There are six body styles in the line, including a four-door sedan, two-door coupe-sedan, three-passenger coupe, town limousine, convertible sedan, and convertible coupe. Options are given on eight different body colors and on a variety of upholstery materials.

The appearance of fleetness and grace which has characterized Lincoln-Zephyrs in the past is accentuated this year by the almost vertical front profile, the vertical lines of the radiator grille, and the "streamlined" center bars of the front bumper. Chromium decorative strips relieve the severity of the unbroken hood-side panel. A bright molding sweeps back to the rear of the body.

The doors now carry extensions at their lower edges to conceal the narrow running boards and to keep them clean. An advantage claimed for this construction is that while the running boards are hidden from sight, they add to the body rigidity the same as in former models. The floor of the passenger compartment is on a level with the running boards, so that it is possible to step from the curb or pavement directly into the car. Shields enclose the rear fender openings.

The gear-shift lever has been removed from the floor and is now located under the instrument panel, the handle being at the driver's right and out of the way of the front-seat passengers. Other controls are recessed in the instrument panel, as an aid to safety. The big 100-mile speedometer, surrounded by the necessary gages, is mounted centrally on the panel, with an electric clock below. There is a large glove compartment on each end of the panel. A vertical grille extending from the instrument panel to the floor conceals the radio, heater, and defroster, when these units are installed.

Other convenience features are a high-beam light switch on the floor and an indicating light in the center of the speedometer dial; a special light beam which illuminates the ignition switch and two long defroster slots in the lower windshield moulding. Additional equipment includes snap-out type cigar lighters and ash trays in the front and rear compartments, twin horns, two windshield wipers, and two sun visors.

The chair-height seats, fitted with individually-wrapped cushion springs, are wide enough to accommodate three persons. Seat cushions and backs are upholstered in narrow pipes—a new style note. Upholstery for closed cars is of broadcloth or cord. A neutral gray trim is used. Carpet scuff strips border the bottom of the doors. Side arm rests are provided in front and rear seats, hassocks and assist cords in the rear compartments of sedans.

Leather and leather with whipcord facing for seat cushions and backs are optional in convertible types. Tan, gray or red leather may be specified, and tops may be khaki or black water-proof material.

Body color options include two new metallic enamels, Arden green and eagle gray. The other colors are dove gray, beetle green, coach maroon, blue, Burgundy red, and black. All body finishes are baked enamel.

A roomy luggage compartment, which is automatically lighted when opened, is reached through the sloping rear deck. A light which illuminates the license place is built into the new deck handle. The compart-

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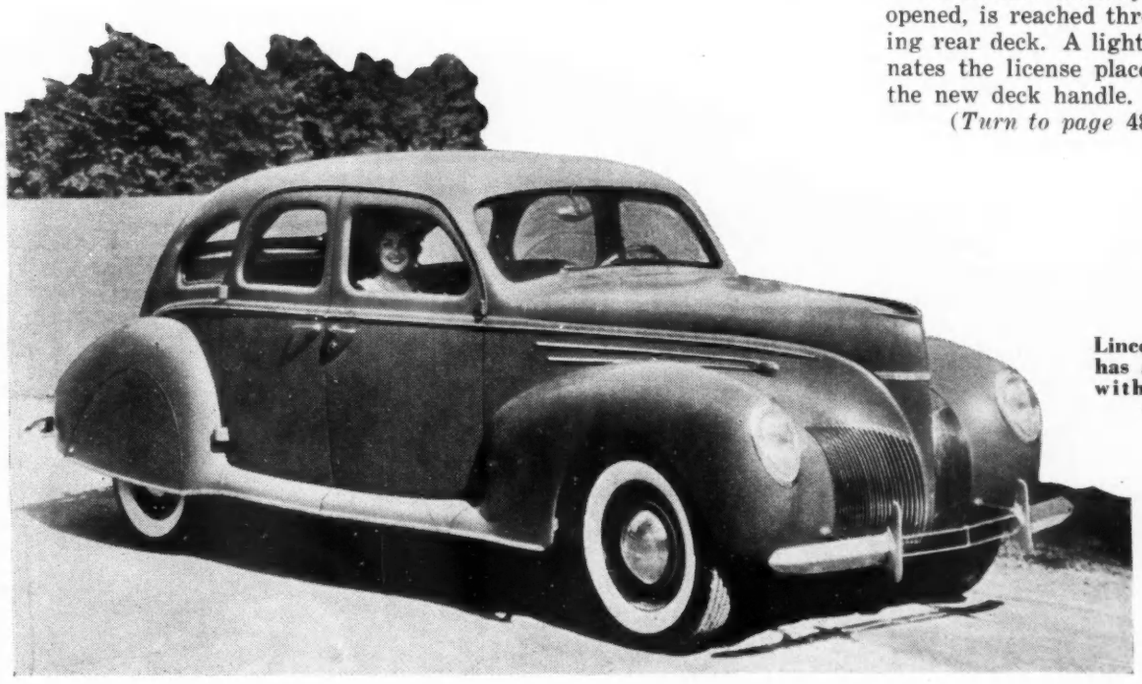
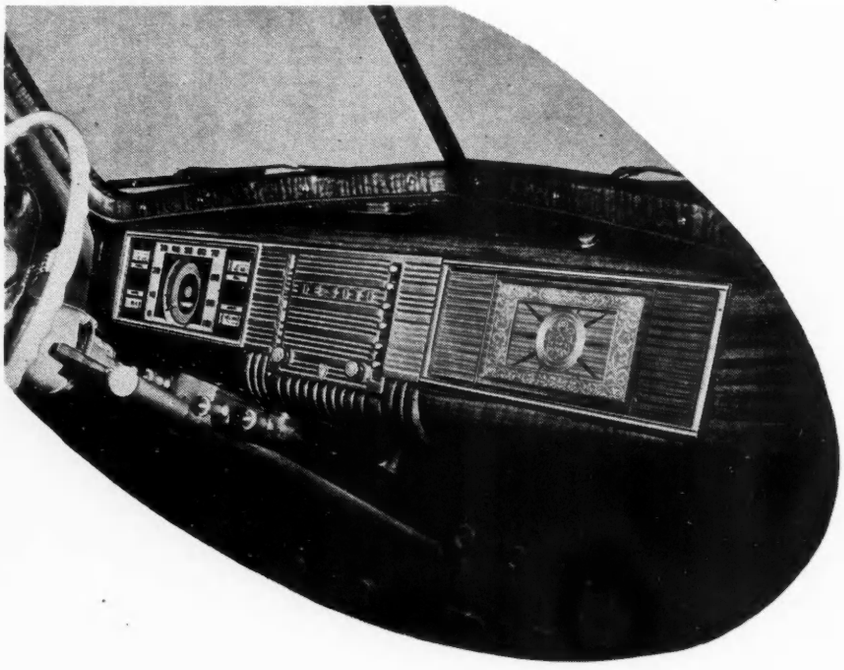
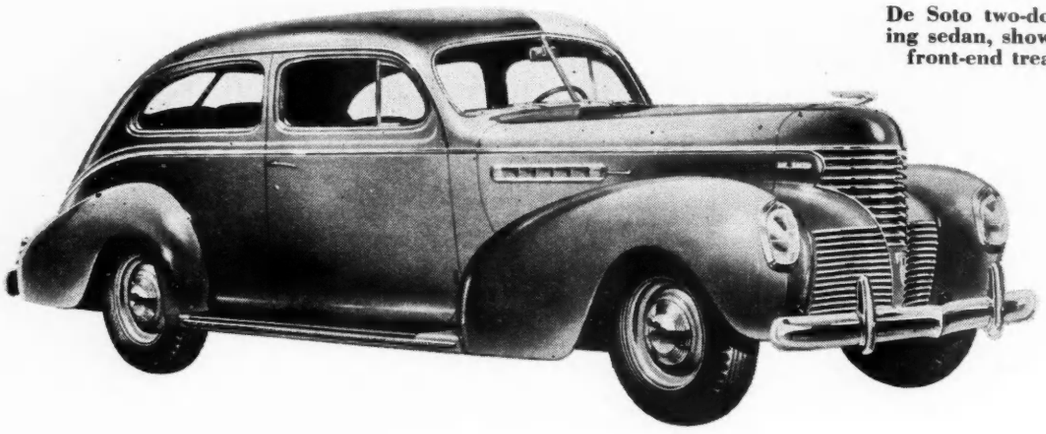


Lincoln-Zephyr now has a front bumper with "streamlined" center bars.



De Soto

De Soto instrument panel, "safety-styled."



De Soto two-door touring sedan, showing new front-end treatment

DE SOTO will offer two lines of cars for 1939, the Custom line and the De Luxe line, both on the same six-cylinder chassis, which comes with a 119-in. wheelbase for the majority of body types and a 136-in. wheelbase for seven-passenger models. The full line includes the Custom four-door touring sedan, De Luxe four-door touring sedan, Custom two-door touring sedan, Custom coupe, Custom coupe with auxiliary seats, Custom seven-passenger sedan, Custom limousine and De Luxe limousine. All models are available in any one of the following colors: Midnight blue; cascade blue, gem green, Williamsburg tan, regal maroon, palace mulberry, streamliner gray, and black.

The 1939 De Sotos are said to be bigger and roomier than their predecessors and have a new streamline styling. The main grille of horizontal chrome-plated bars is retained, but two smaller grilles of horizontal chromium-plated bars have been added below it. The hood has been lengthened to 55 in. Both front and rear fenders are of a new design suggesting motion. From the grille, flowing lines sweep back to the concealed luggage locker at the rear. The former "bustle-like" integral trunk has been done away with, and its place has been taken by inside luggage space of greater capacity. In sedans the luggage locker has 23 cu. ft. usable space, 27 per cent more than last year, while in the business coupe the usable space amounts to 48 cu. ft.

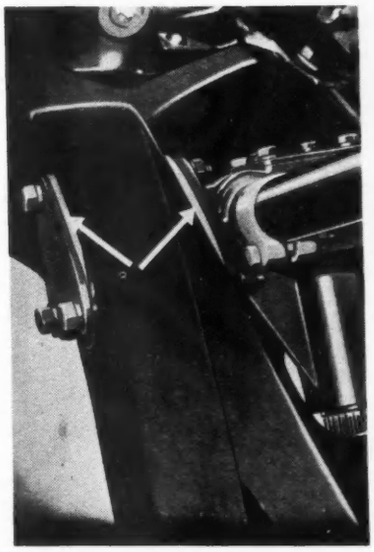
At the "A" posts the new body is 4½ in. wider than last year, and the front seat is said to afford ample room for three persons. In the coupe there are two inside auxiliary seats. To provide greater visibility, the V-type windshield has been made both higher and wider, and the area of safety glass has been increased all around.

Among De Soto features for 1939 are the following: Column-mounted

Offers Two Lines for 1939

shift lever (standard equipment on all models), independent front-wheel springing, an overdrive (optional at extra cost) which, in combination with the three-speed-and-reverse transmission, gives five forward speeds; a new safety-signal speedometer showing green, amber or red light, according to the speed of travel; rotary door locks which obviate the need for door slamming; Durasheen finish, which is claimed to retain its luster better; a rain trap in the cowl ventilator that permits driving in rain with the ventilator open and facilitates the installation of a fresh-air attachment available on heaters; electric windshield wipers with 10-in. blades; a softer clutch requiring one-third less pedal pressure.

The six-cylinder engine has a bore of 3⅜ in. and a stroke of 4¼ in. (228.1 cu. in. displacement), and is rated 93 hp. at 3600 r.p.m., with cast-iron head and 6.5 compression ratio. Aluminum cylinder heads are available at extra cost; they give a compression ratio of 7 and raise the output to 100 hp. at 3600 r.p.m. All engine working parts are provided with the new Chrysler super-finish. Chassis springs of Amola steel have tapered leaves. A new design of air-wheel tire is fitted. The fuel tank now holds 18 instead of 16 gallons. The pistol-grip parking-brake lever is mounted on the dash to the left of the driver, leaving the driver's compartment entirely unobstructed. Provision for mounting a push-button tuning radio speaker behind the center panel is made in the new instrument panel. Built-in chevron-styled tail lamps are standard on all models. The steering wheel, which is of 18-in. diameter, carries a recessed horn ring.



Rubber-mounting of De Soto steering column.

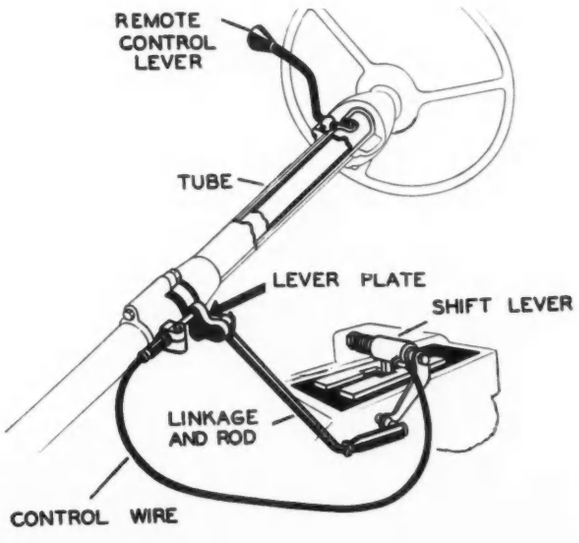


Diagram of De Soto gear-shift mechanism.

Customers are offered a choice of Taupe Bedford cord and blue-gray pile fabric for the upholstery of De Luxe models, and of blue and tan broadcloth on other models. The driver's seat is adjustable and automatically rises as it moves forward. Final drive is by hypoid gears, which makes possible a flat, low floor in the rear compartment.

The motion of the shift lever is transmitted by a tube located inside the steering column. As soon as the shift lever has been moved to the "first-speed" position, it is pushed down by a spring, so that when the driver wants to shift into second, all he has to do is to perform a sweeping motion forward. By rubber-mounting the steering column on the frame the tendency to driver fatigue is reduced.

New Rear-Spring Suspension

FIVE series, featuring thirty-six body styles, comprise the Cadillac-LaSalle line for 1939. With the exception of the Sixteen, all models are new in appearance, particularly as to the hood treatment, three-section die-cast radiator grilles, and the smartly-faired, long-bodied headlamps mounted on the hood side.

The LaSalle differs from the other models in front-end styling, featuring a vertical grille of slender proportions, and two fender-mounted side grilles. The Cadillac eights resemble each other in styling, with characteristic gracefully-formed radiator grilles and fender-mounted side grilles.

Running boards are standard on all lines except the Series 60 S, but LaSalles and Series 61 Cadillacs may be ordered without running boards if desired. Sunshine roofs, an optional feature, will be available on the Series 50, 60S and 61 five-passenger sedans, and on the Series 50 five-passenger touring coupe. The LaSalle this year has a wheelbase of 120 instead of 124 in., but its overall length is 1 in. more than last year. The "competitive" Series 65 has been dropped, while Series 61 has a new frame and a new wheelbase of 126 in.

In the LaSalle and Series 61, riding comfort has been increased by the introduction of the "high-plane Hotchkiss drive" and new variable-rate rear-spring suspension incorporating a tension shackle.

All cars in the line continue the column-mounted gear-shift lever, but the travel in shifting from second to high or vice versa has been reduced 2 in.

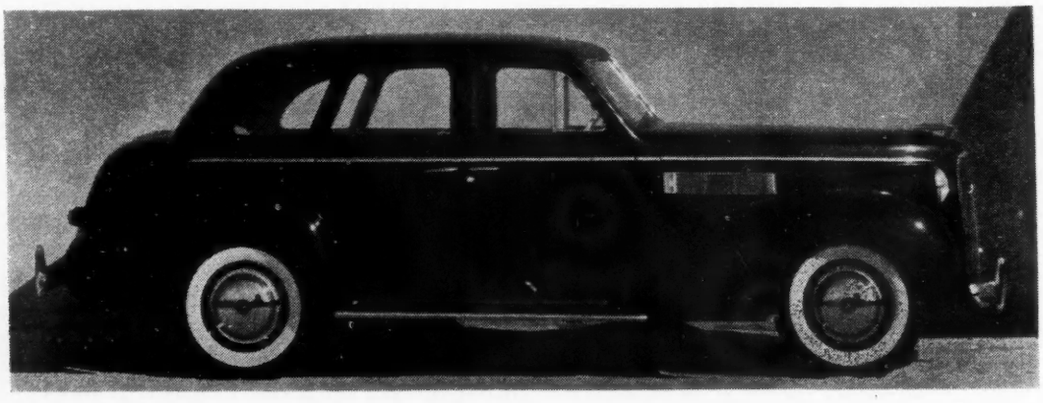
The LaSalle has a 90-degree V-8, L-head engine of 3⅜ in. bore by 4½ in. stroke (322 cu. in.), rated 125 hp. at 3400 r.p.m. with cast iron head, and a 6.25 compression ratio (5.75 compression ratio optional for export).

Cadillac eights have a 90-deg. Vee, L-head engine of 3½ in. bore by 4½ in. stroke (346 cu. in.) with cast-iron head. On Series 61 and 60S it is rated 135 hp. at 3400 r.p.m. with the 6.25 standard compression ratio, 6.7 and 5.75 ratios being optional. The engine of Series 75 is rated 140 hp. at 3400 r.p.m., with the standard 6.7 compression ratio; 6.25 and 5.75 ratios are optional.

The engine of the Sixteen is of the 135-deg. Vee, L-head type, with 3¼ in. bore by 3¼ in. stroke (431 cu. in. displacement), rated 185 hp. at 3600 r.p.m. with cast iron head and the standard 6.75 compression ratio; a ratio of 6.08 is optional.

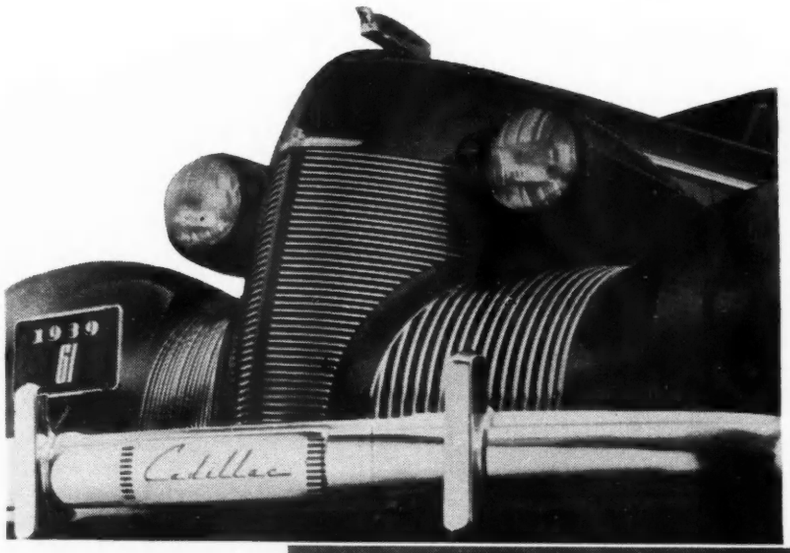
Engine supports on the 50, 60S and 61 are now non-adjustable. To improve the camshaft balance, the fuel-pump eccentric has been relocated and a balance weight added to the sprocket. On all V-8s Perfect-

In the Cadillac line more glass area results in better vision than in previous models.



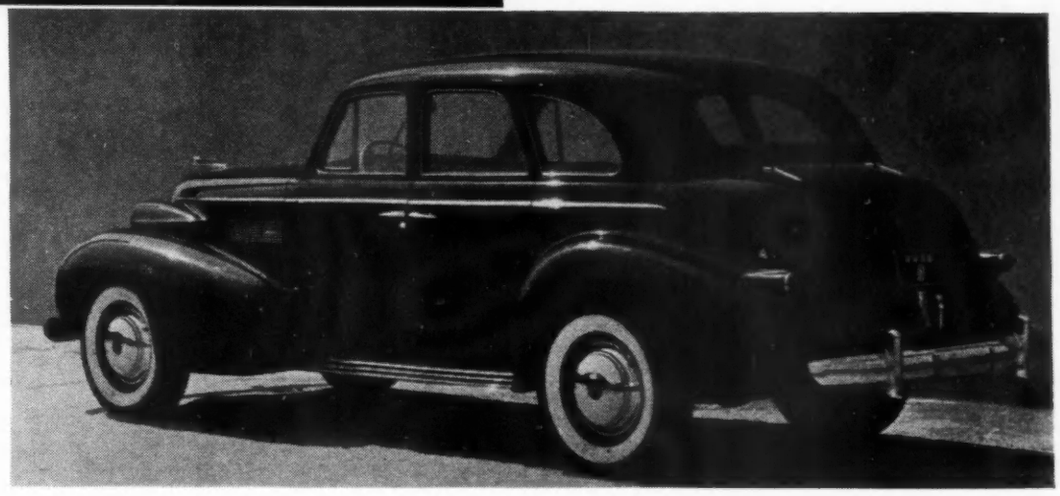
The styling of the La Salle line is quite distinctive.

on Cadillac 61 and La Salle Lines



independent suspension. These arms are pressings instead of forgings, and they, as well as the knuckle-pin supports, have been redesigned for increased strength and road clearance. Each lower arm is supported upon a stationary shaft bracketed to the frame crossmember, and the two are riveted together to form the "wishbone." The torsion-rod front stabilizer bar has been stiffened and the front-spring coils are smaller in diameter.

Fabric covers now enclose the ends of the two longest liners of the

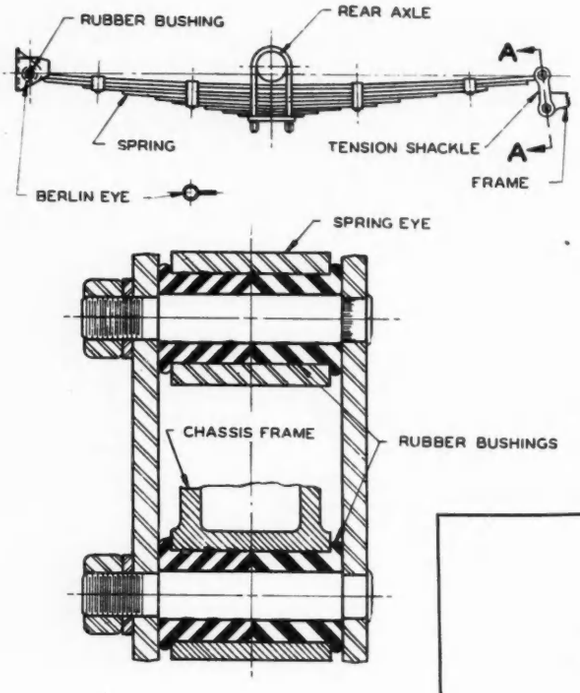


The Cadillac 61 has a new front treatment, the bodies are roomier, rear doors, hinges and upper front hinge are concealed.

Circle rings with Ferrox treatment are now used, and the top land on the piston has been made wider to better protect the topmost ring against heat. The top compression ring is narrower (3/32 in.), and deeper to increase the unit pressure.

A crankcase ventilating outlet is now located in the slip stream below the rear part of the engine. The new oil pan is shorter and deeper, which permits running safely on a smaller oil reserve. All models except the Series 90 now have a tube-and-fin-type radiator core, instead of cellular cores. They are lower and wider, to suit the new hood contours, and also more rugged, permitting relief-valve pressures up to 5½ lb. per sq. in. In Series 90 the relief pressure remains 7 lb. per sq. in. Automatic shutters are continued.

The Carter carburetor is continued on the LaSalle, and the Stromberg on the Cadillac Eights. On the Stromberg carburetor the electrically-heated choke has been superseded by one actuated by exhaust-manifold temperature, for the sake of simplicity. Valve-tappet parts are Ferrox-treated. There are new rubber bushings in the inner ends of the lower control arms of the front rear springs. The so-called "high-plane" Hotchkiss drive of the LaSalle and Cadillac 61 is claimed to combine riding comfort with roadability. With the new rear suspension the cross-link stabilizer was found to be unnecessary, and was discontinued. Rear springs on these two models are mounted inside the frame sidebars; tension shackles have replaced compression shackles, the shackles as well as the rear-spring front eyes have rubber bushings at top and bottom, and no lubrication is required. On the Series 75 and 90, inertia-control of the rear shock absorbers has been discontinued, man-

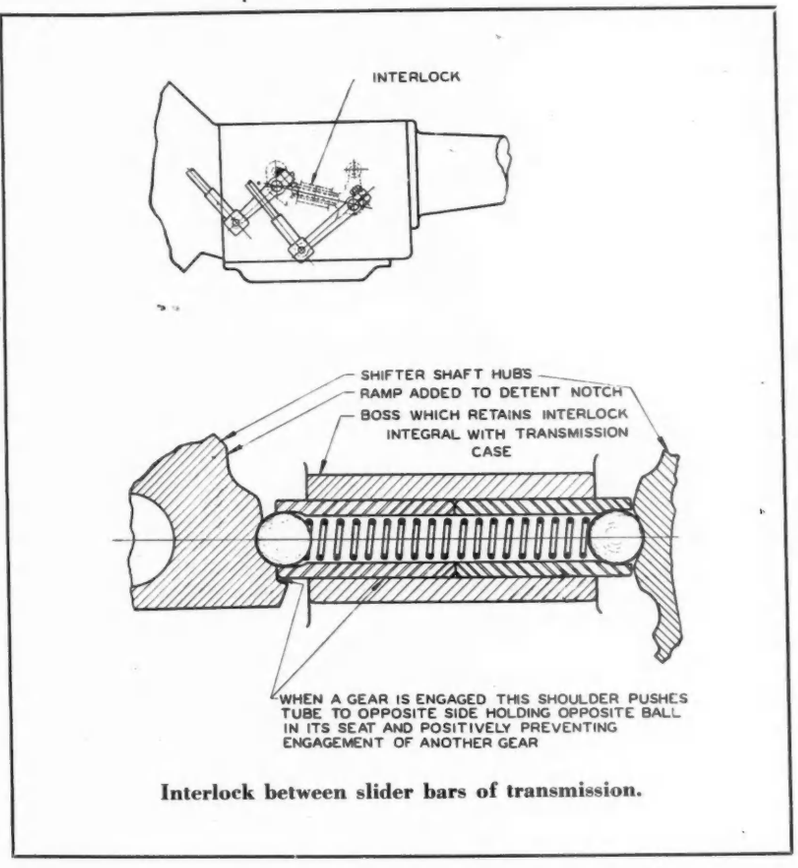


Details of new rear suspension.

caster of these models has been decreased.

All series have new steering wheels. On the LaSalle, the hub is a rubber-covered steel forging and the rim section is egg-shaped and is claimed to provide a more comfortable grip. In order to give a clear view of the instruments, the angle between the upper two of the three spokes has been increased from 120 to 156 deg. The flexible-spoke wheel is an extra for the LaSalle, but is standard on all Cadillacs.

The X-type double-drop frames of the LaSalle and Cadillac 61 are lower. The frame of the 61 and that



Interlock between slider bars of transmission.

ual control being now standard.

A positive interlock mechanism provided within the transmission case has permitted reducing the stiffness of the ball-detent springs, so that less effort is required in gear shifting. Shift-lever total travel in shifting from second into high has been reduced from 8 to 6 in., and the neutral position has been lowered 1 in. To further facilitate gear shifting, the bracket which supports the transmission control shafts at the bottom of the steering column has been redesigned, and stops have been provided on the second-speed synchronizing drum which prevent the cam and spring from shifting off the pin in second gear.

A steel-back babbitt thrust washer and steel-back babbitt bearings replace the bronze washer and bearings formerly used for the reverse idler gears. One size of hypoid rear axle is used on Series 60, 60S and 61; another larger design is used on Series 75 and 90. The smaller axle now has a compressible steel spacer between the two pinion bearings, which eliminates the need for shim adjustment. The yoke nut at the front of the pinion shaft is tightened until the correct degree of preloading is secured, as measured by the torque required to rotate the pinion shaft. The larger axle also has these pinion-bearing spacers.

In the Duo-Servo hydraulic brake system on Series 50 and 61, the master cylinder is now mounted ahead of the pedal. Front brakes are 2 in. wide. Series 50 and 61 now use cross steering, and the negative

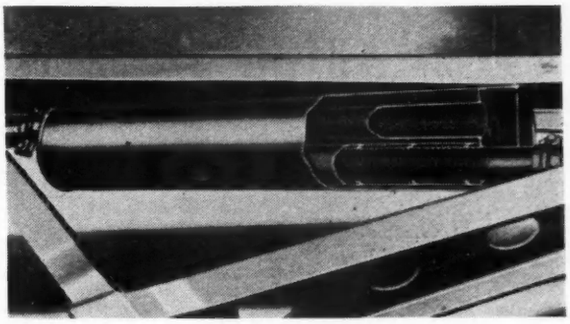
used with LaSalle convertible bodies have heavier X-members.

Wheel and tire sizes remain the same. Disk wheels of Series 50, 60S and 61 have four additional, equally-spaced slots just inside the rim, which permit of the use of emergency chains and also assist in cooling the brakes.

On Series 50, 60S and 61, forged-steel front hubs supersede the former malleable iron type, and the spindle diameter at the inner bear-

ing has been increased 1/32 inch.

On Series 50 and 61 the three-pass muffler, which has taken the place of the former "straight-through" type, has a heavier double-wrapped outer shell made of terneplate, which is secured to the headers by lock seams instead of by welding. The muffler is supported by rubber insulators at both ends, while the tail pipe is supported by a fabric-and-rubber insulator. On the 60S, 75 and 90 the new muffler is said to reduce the back pressure by 40 per cent.



Cut-away view of new "three-pass" muffler.

A new clutch-driven disk has been adopted for all series except the Sixteen. It is cut into a number of segments, each "waved" to make it act as a cushion, and the greater uniformity of pressure distribution has permitted reducing the diameter on the LaSalle to 10 in.

All models have the instruments set in a narrow panel along the top under a narrow glass cover of curved section. The temperature gage is now electrically operated. All controls other than the light switch are recessed in the lower edge of the board; they are of the pull type and are of plastic material finished in light color.

Adjusting devices on the new streamlined headlamps are more accessible. The vertical adjustment is at the bottom of the lamp, while the horizontal adjustment is made by means of a screw on the inside edge of the lamp, immediately behind the lens, and between it and the radiator casing.

License plates on Cadillacs and LaSalles are now mounted in the center of the trunk lid or rear deck, and illuminated from below by a lamp integral with the trunk or deck-lid handle. The license plate is illuminated by a single 3-c.p. bulb.

On the LaSalle and Cadillac 61, the rear lamps are mounted on the body beside the rear fenders. Each lamp has a double-filament bulb, a 3-c.p. filament being used for continuous illumination; a 15-c.p. as a stop light.

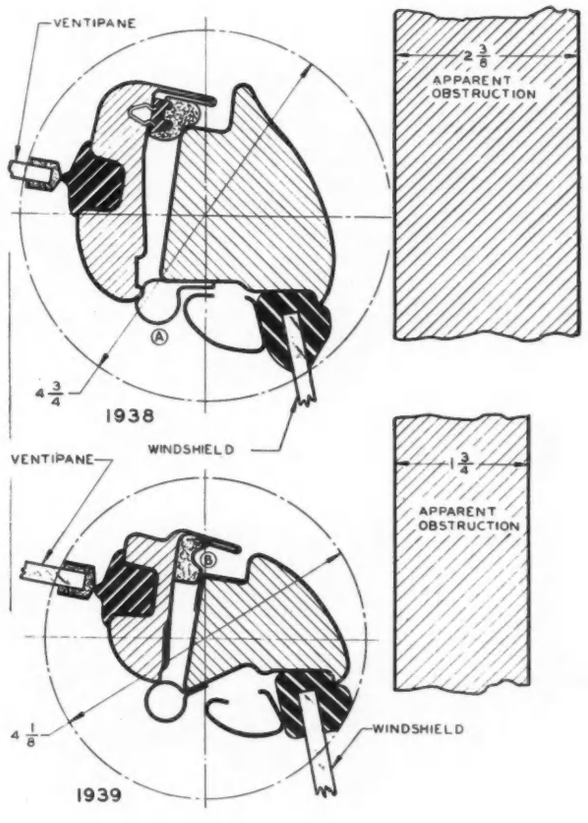
The Series 75 battery is now of standard height, the former projecting handles having been eliminated. The LaSalle battery is mounted below a cover in the left side of the front door. The larger generator used for Fleetwood models has a gross maximum charging rate of 30 amperes.

Bodies for LaSalle and Cadillac 61 are roomier and have more window glass, resembling those of last year's Series 60S. Outside door locks are installed in both front doors, and each lock cylinder has a spring-actuated cover. Both rear-door hinges and the upper front-door hinge are concealed.

Looked at from the rear, the body flares outwardly around the trunk to meet the narrow rear fenders, giving an effect similar to that of the catwalks at the front. The new rear lamps are mounted on the "fillet." They are of projectile shape and are all in body color, except for the red lenses, on which there is a disk of reflecting material at the center.

A hood support in the center of the dash, provided with counterbalancing springs, helps to lift the alligator hood and holds it in its raised position. Separating the hood-supporting linkage and springs from the hinges has reduced friction. The hood latch is still released by lifting the radia-

(Turn to page 484, please)



Sectional views showing the "blind angles" due to front corner posts in old and new bodies.

1939 Pontiac Quality four-door sedan though greatly restyled from last year's models still retains the silver streak as the central motif on the front.

New Transmission,

PONTIAC'S program for the 1939 season covers three new cars—the DeLuxe Eight, the DeLuxe Six, and the new Quality Six. Pontiac continues its established Silver-Streak lines in graceful, flowing contours. Sheet-metal front grilles are finished in body color and are flanked by two chromium-plated die-cast grilles blending in the front-fender aprons.

DeLuxe Sixes and Eights are mounted on the same low chassis and come in the same four styles of Fisher unisteel bodies. These cars will be offered with or without running boards, at the option of the purchaser. The Quality Six is a new, slightly smaller car which is available in five body styles. The new bodies incorporate such recent Fisher developments as large window areas and slender pillars, which make for better visibility.

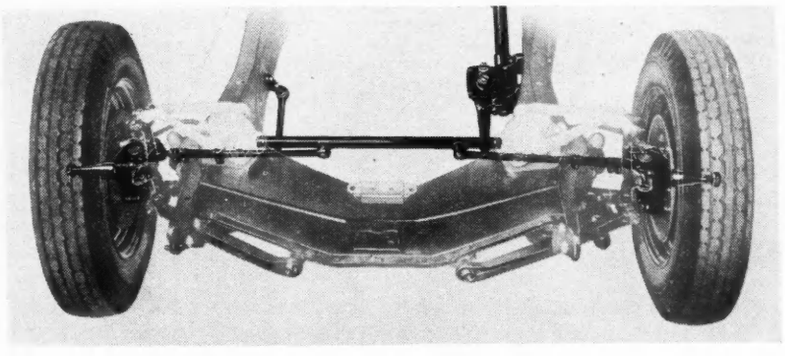
Engines are continued essentially unchanged, and the same six-cylinder design is used for both the DeLuxe and the Quality Six. A clutch with a one-piece, cone-shaped spring is now used on all chassis. The column-mounted gear-shift lever pioneered by Pontiac last year becomes standard equipment on all models, in combination with a new transmission specially designed for remote control.

Variable-rate springs, recently recommended as a means to achieve better riding qualities, will see their first production application in the new Pontiacs, in combination with a new propeller-shaft drive and inclined, direct-acting shock absorbers. A hypoid rear axle is now standard on all models.

The DeLuxe Eight is powered by an eight-cylinder L-head engine of 3¼-in. bore by 3¾-in. stroke (248.9 cu. in. piston displacement) which is rated 100 hp. at 3700 r.p.m. with cast-iron head and 6.20 compression ratio. This engine, which is unchanged in its essential features, has cast-iron pistons of chrome-nickel iron, tin-plated, with three rings.

Both the DeLuxe Six and the Quality Six are powered by a six-cylinder L-head engine of 3 7/16-in. bore by 4-in. stroke (222.7 cu. in. displacement), which is rated 85 hp. at 3520 r.p.m., with cast-iron head and 6.20 compression ratio. Pistons are of the same type as in the eight-cylinder. All main and connecting-rod bearings of this engine have been increased ⅛ in. in diameter.

Owing to the fact that an alligator hood is now used, together with sta-



The steering tie rods are pivoted at separate points on a horizontal bar, these pivot points being directly in line with the points about which the knee action units swing.

tionary hood panels, the spark-timing pointer is now located directly above the distributor, for better accessibility. A Carter downdraft, triple-venturi carburetor is now used, with fewer parts than last year's carburetor model. The float chamber is now baffled, so that the fuel level is not affected by fast cornering. Another refinement is the addition of an air bleed in the main fuel nozzle. A throttle-controlled, positively operated fuel economizer replaces the vacuum-type formerly used. The accelerator pump and economizer linkage are enclosed in a sealed, die-cast housing.

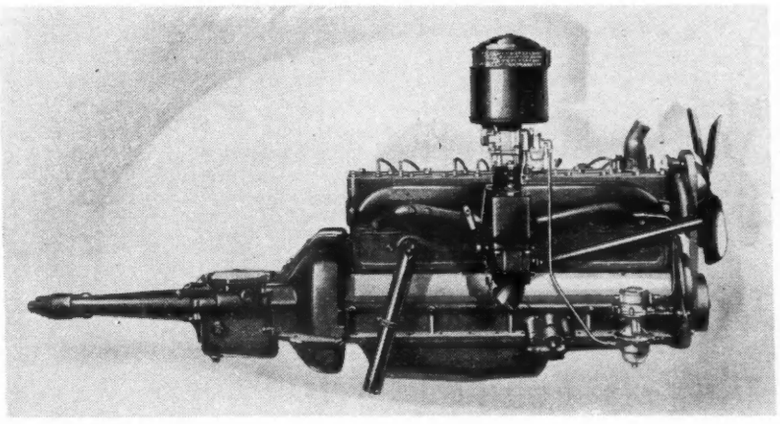
A single-plate clutch with a one-piece Belleville-washer-type spring is standard on all models. It incorporates 18 integral release fingers, which makes for better pressure distribution.

The exhaust manifold now is a single casting, instead of a two-piece design, and the intake manifold has been redesigned accordingly, with slightly thicker walls at both center branches to support the carburetor and air cleaner. Thermostatic heat control and steel-tube riser remain the same, but the thermostat air tube is omitted. The fan used on last year's eight-cylinder engine is now used on both models. Heavier front and rear enclosing plates on the balancer weight replace the outer crimped ring and inner ferrule formerly used. The muffler shell is now made of corrosion-resistant terne plate (lead-coated steel).

Refinements have been made in the remote-control gear shift, which is now standard equipment. It now has an enclosed and lubricated Bowden-wire control for the cross movement. An "over-center" spring reduces the effort required to shift, and means are provided for adjusting the shift lever to suit people of different reach. The new mechanism comprises a single, solid control shaft for transmitting both the shifting and the cross-over movement. At the top it terminates in a ball housed within a threaded fulcrum bushing in the shift lever. This bushing, besides serving its principal function, provides the means for adjusting the shift-lever location. At its lower end the control shaft has welded to it a short stamped lever that connects to a lever on the transmission.

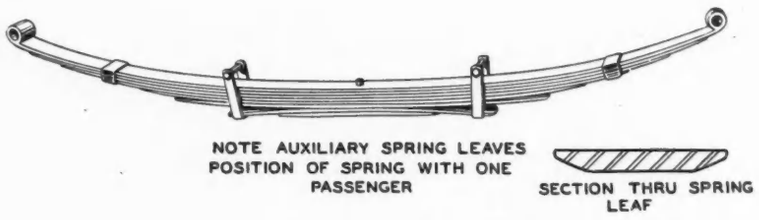
The rear springs comprise aux-

Clutch, Rear Axle on '39 Pontiacs



(Above) The 1939 Straight Eight engine has tin plated, chrome-nickel-iron pistons—rifle-drilled connecting rods—metered flow lubrication.

(Below) The DeLuxe Eight four-door sedan has curb high floors which permits the omission of running boards.



The two-stage rear spring and section of a spring leaf.

iliary or helper springs that come into action as the load is applied, the effect being to give about the same comfort with one passenger as with six. These springs have a very low frequency, 72 to 76 per minute, and are said to maintain this frequency for all passenger loads. Spring friction is controlled by providing tightly-fitting metal covers with "sealed-in lubrication" for spring leaves. Spring mountings are cushioned in rubber, as before. Spring leaves are tapered at the ends to permit flexibility and eliminate areas of high pressure. Another feature is the use of a special tapered cross section of spring leaves, which ensures more nearly uniform beam loading and stress distribution in the leaf.

Adoption of variable-rate leaf springs is said to have greatly simplified the shock-absorber problem. Direct-acting hydraulic shock absorbers are employed, with a dual piston-rod release replacing the single type formerly used. Rubber bushings in the shock-absorber eyes eliminate the need for ball-and-socket joints and their attendant lubrication fittings. The direct-acting shock absorbers are so mounted that their upper ends incline toward the center of the chassis, which produces a steadying effect on the chassis. In the front suspension, pressed-steel lower control arms replace the forgings formerly used. The threaded steel bearings are protected by rubber seals.

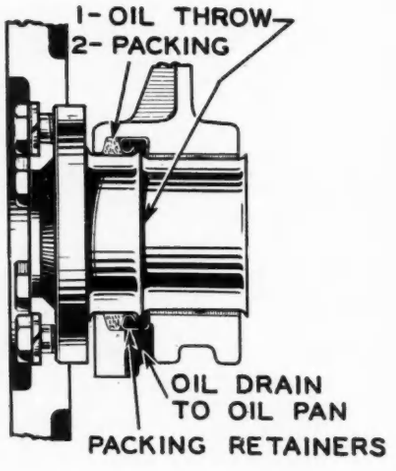
The steering geometry has been improved by the adoption of a link-parallelogram hook-up, comprising a horizontal rod extending from the end of the pitman arm to an idler arm on the opposite side rail. The rod always moves parallel to the line connecting centers of the front wheels. Two short tie rods connect by ball joints to the parallel link. Tie-rod centers have the same spread as the knuckle pins, thus eliminating most of the reaction due to vertical motion of the wheels.

With the floor level of de luxe models this year lowered 2 in., even the dual-shaft drive would have necessitated a shaft tunnel of objectionable depth, for which reason the hypoid drive was adopted. Except for the gearing, the hypoid axle is similar in all respects to the axle formerly used. A minor change in the rear-axle-shaft oil seal brings the felt in direct contact with a ground surface on the shaft, instead of with the wheel-bearing sleeve. The drive is now practically straight-line. On the DeLuxe Eight and Six there is an extension on the transmission housing, while on the Quality Six, which has a shorter wheelbase, this extension has been eliminated.

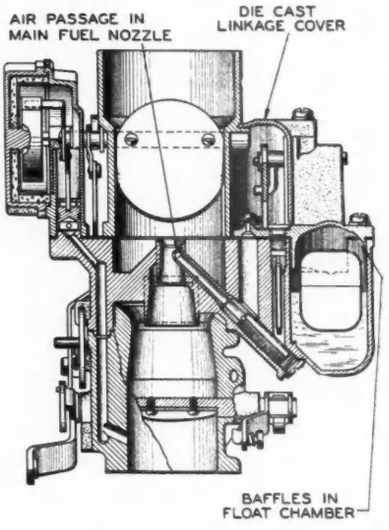
The transmission, which retains the same gear-face widths and torque capacity, is 9/16-in. shorter than the former model, and somewhat lighter, but more rigid. The changes in design consist mainly in provisions for the remote-control shifting, but a change has been made also in the low-speed gear ratio, which is now larger and gives better performance in low gear.

In the operation of the transmission, two shifter forks are engaged alternately by a cam shift bar. Of these two forks, the one for the high and second speeds is mounted on a sliding shaft at the right, and the one for low and reverse, on a shaft at the left, these sliding shafts extending parallel to the main shaft, above it. Cams on the shift bar on each side of the assembly are so spaced that when one engages its shifter fork, the other is drawn away from the opposite fork sufficiently to clear it.

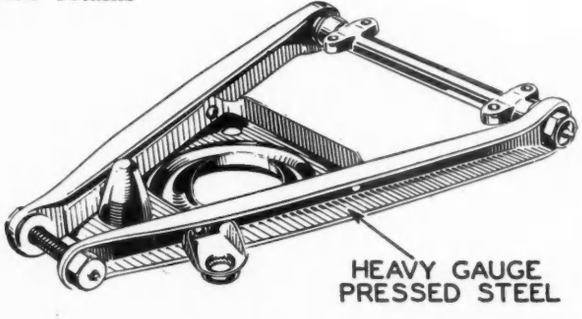
The brake drums, which are of



Oil seal at rear main bearing



Sectional view of Carter carburetor.



Pressed-steel lower "wishbone" of front independent suspension.

chrome-nickel iron, are 11 in. in diameter. A new brake lining material has been adopted.

Alligator hoods with over-center hinges and a dual safety catch on the radiator ornament lock are standard on all models. Batteries are mounted under the hood, on the side rail, the long type, with end-to-end cell arrangement, being used.

Of Automotive Interest at Metal Exposition

(*Continued from page* 472)

types of diamond wheels and the latest advances in the manufacture of Norbide (Norton Boron Carbide) gauges and accessories.

The Ohio Crankshaft Co., Cleveland.
Exhibiting (in operation): Production Tocco camshaft machine unit hardening the new Packard Six pearlitic malleable camshaft.

Production Tocco special type machine hardening the Packard transmission drive shaft at the rate of 135 per hour and producing three degrees of hardness on the same piece in one operation.

Production Tocco crankshaft machine.

Display of typical Tocco hardened parts and photo-micrographs of typical structures.

Tinius Olsen Testing Machine Co., Philadelphia.
Exhibiting (in operation): Latest design Universal Testing Machine. New (first showing) direct reading automatic Brinell hardness tester. (Production type.) New automatic ductility tester. New design high magnification recorder.

Pangborn Corp., Hagerstown, Maryland.
Exhibiting: Display featuring latest improvements and designs in Rotoblast Cleaning Equipment.

Parker-Kalon Corp., New York City.
Exhibiting (in operation): Large scale models of various fastening devices. Two motor-driven mechanisms, which are for the purpose of illustrating the advantages derived through the use of Self-tapping Screws.

Reeves Pulley Co., Columbus, Ind.
Exhibiting (in operation): Various units and controls in the complete line of Reeves variable speed control equipment including the Variable Speed Transmission, Vari-Speed Motor Pulley and Vari-Speed Motodrive.

Republic Steel Corp.
Ehibiting: New developments in Republic Alloy and Enduro Stainless Steels are featured. With vital parts of Republic Alloy Steels, the racing car in which Jimmy Snyder won the 1938 Dirt Track Racing Championship of America at Syracuse is on exhibit. The widest strip sheet ever produced on a continuous cold strip mill is also on display. Products of Union Drawn Steel Division, Bolt and Nut Division, Berger Manufacturing Division, and Republic's subsidiaries, Truscon Steel Company and Steel & Tubes, Inc., are included.

Riehle Testing Machine Division of American Machine and Metals, Inc., East Moline, Illinois.
Exhibiting (in operation): One Universal Hydraulic Testing Machine of 40,000 pounds capacity, with various accessories. One Combination Izod-Charpy-Tension Impact Testing Machine. Various Extensometers.

Rustless Iron and Steel Corp., Baltimore.
Exhibiting (in operation): Various products made from stainless steel bars and wire.

Joseph T. Ryerson & Son, Inc., Chicago.
Exhibiting: Exhibit explains "Certified Steel" with particular emphasis on the unique alloy steel quality control plan. It consists of a background panel with pictures and illuminated flasher sign. Also table for product display and furniture.

George Scherr Co., Inc., New York.
Exhibiting (in operation): The New Busch Universal Microscope, the Metaphot; also Busch comparison microscope.

Shakeproof Lock Washer Co., Chicago.
Exhibiting (in operation): Shakeproof "Sems," the patented pre-assembled lock washer and screw, is the newest addition to the line of Shakeproof Products which is exhibited for the first time to the metal working industries. Specially built laboratory testing equipment is used to effectively dramatize the advantages of Shakeproof lock washers and thread-cutting screws.

Steel City Testing Laboratory, Detroit.
Exhibiting (in operation): 1. Revelation Direct Reading Brinell Machine 500 to 3000 Kgs. 2. A real Dynamic Balancing Machine. 3. Improved Ductility Testing Machine, old and new penetrators. 4. Highly efficient and most accurate Dead Weight Brinell Machine for Laboratory and Semi-Production. 5. Highly refined spring testing machines—Ranges from 10 grams to 1000 lbs. 6. Revelation Direct Reading Hardness Tester for light loads, using ball, diamond penetrator, and pyramid diamond. 7. Hydraulic Universal Testing Machine loads 20 to 60,000 lbs. 8. Hydraulic Universal Testing Machine load 100 to 5000 lbs. 9. Pendulum Type Tensile Testing Machine for wire, strip, etc.

D. A. Stuart Oil Co., Ltd., Chicago.
Exhibiting (in operation): A new class of EP lubricants recently developed.

Full line of (EP) industrial oils and greases. Featuring their well known "Thred-Kut" oil; Stuart's "Kleen-Kut" soluble oil; Stuart's "Codol" liquid grinding compound, a comparatively new development in soluble grinding and cutting oil, Stuart's "Super-Kool" drawing lubricants (for stainless steel); as well as a display of sample parts machined with these well-known lubricants.

Surface Combustion Corp., Toledo, Ohio.
Industrial Gas Exhibit.
Exhibiting (in operation): Exhibited in operation will be an atmosphere furnace for heat treating high speed steels—also a variety of burner equipment, including several new burners developed during the past year. In addition, there will also be on display numerous parts heat treated in SC furnace as well as photographs of typical recent furnace installations.

C. J. Tagliabue Mfg. Co., Brooklyn, N. Y.
Exhibiting: New Superspeed Celectray Recording Pyrometer that is designed to expose heretofore uncharted, but vital, temperature changes.

New Celectray Pyrometer of the indicating type is on display. Developed to meet an economical means of obtaining throttling control of electric furnace.

New line of Tag Pressure Spring Instruments with many convenient refinements are displayed for the first time.

Tide Water Associated Oil Co., New York.
Exhibiting (in operation): Cutting oils and their application on the side and central panels.

Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
Exhibiting: Samples of ferro titanium and zirconium alloys. Samples of foundry zircon sand and flour. Steel, iron, and aluminum castings. Zircon refractories.

United States Steel Corporation Subsidiaries, Pittsburgh.
Exhibiting: A joint display of the products and facilities of the American Steel & Wire Company, Carnegie-Illinois Steel Corporation, Columbia Steel Company, National Tube Company, Scully Steel Products Company, and Tennessee Coal, Iron & Railroad Company.

A central structure provides two large interior booths within the display, one containing a 50-seat theatre where the 4-reel Technicolor movie "Steel, Man's Servant" and an industrial film describing the manufacture and uses of the high-tensile, corrosion-resistant steel, Cor-Ten, will be shown several times daily. The opposite space will feature graphically some of the newer concepts of hardenability which will be discussed at the Technical Sessions, together with a special exhibit of the austempering process now being commercially utilized by the American Steel & Wire Company.

The four wing walls of the central structure will consist of wide sheets of cold finished steel with a border of stainless steel strip, sweeping in from coils at the four corners to a central passageway through the booth. From the gleaming steel surfaces will appear a streamlined train, a tractor, a bus, and an automobile in attractive bas-relief. The walls of the passageway furnish space for attractive dioramas symbolic of the manufacture and uses of steel.

Wilcox-Rich Division of Eaton Manufacturing Co., Detroit.
Exhibiting: The application of "Xaloy" and "Wilrich Alloys" by centrifugal casting fused to any steel. Abrasion or wear resistance with varying degrees of corrosion resistance are the inherent properties of these alloys.

Xaloy, also known as I.R. Metal, is being used extensively in the oil fields under the trade name "Di-Hard."

Carl Zeiss, Inc., New York.
Exhibiting (in operation): Metallograph Neophot, for bright field, dark field and polarized light observation of metal specimens at all suitable magnifications. Spectrograph QU 24" for the quantitative and qualitative analysis of metals in the industrial laboratories. The instrument is well adapted for this purpose, because it requires no particular experience, skill or complicated adjustments. Spectrumline Photometer for evaluating spectrograms in quantitative analysis. Spectrum Projector for evaluating spectrograms in quantitative analysis. Feussner Sparking Apparatus, patented, keeps at a constant the energy emanating from a source of light.

Lincoln Zephyr for '39

(*Continued from page* 473)

ment is dust- and water-proof and also encloses the spare tire, which is carried on a steel rack that drops down to allow easy loading and unloading of luggage.

The efficiency of the cooling system has been increased by the new, lower radiator grille and the new location of the fan. The latter is now mounted on the crankshaft behind the radiator-grille openings, so that air is drawn into the engine compartment directly.

The new hydraulic brakes are of the self-energizing type and ensure equal distribution of braking force to all four wheels, cushioned pedal action and quiet operation. No part of the service-braking system requires lubrication. The parking-brake lever applies the shoes of the service brakes in the rear wheels through a cable-mechanism enclosed in conduits.

Other mechanical improvements include rubber-cushioned body mountings, a new rear mounting for

the engine, a more rigid differential housing, and a heavier torque tube. A two-speed overdrive axle is available on special order.

The wheelbase of the Lincoln-Zephyr is 125 in.; the springbase, 136 in. In the transmission, a blocker-type synchronizing unit is used for second and high speeds, to minimize clashing during gear shifting. Rear-axle gears are of the hypoid type. Hydraulic double-acting shock absorbers are fitted.

The Lincoln-Zephyr is equipped with a twelve cylinder V engine of 2¾-in. bore by 3¾-in. stroke (267.3 cu. in. displacement), rated 110 hp. at 3900 r.p.m. with aluminum cylinder head and 6.7 compression ratio.

Cadillac, LaSalle for '39

(*Continued from page* 479)

tor ornament, but it is unnecessary to follow this with release of the safety catch, which is now effected automatically by lifting the radiator ornament.

The dash insulating pad now consists of four double thicknesses of asphalt-impregnated slaters felt, each double thickness consisting of one plain and one waffled sheet of the material.

Seat backs of tubular steel for the front seats increase the rigidity and permit of a neater trim around the top of the seat back and of the use of deeper springs. Warm air from the front-compartment heater can now pass below the seat to the rear compartment.

Inside locks have been added to all closed-car front ventipanes, to increase theft resistance. These consist of inconspicuous sliding ventipanes open from the outside. Rear-quarter sliding windows lock automatically in any position.

The sunshine roof (offered as an extra) consists of a panel extending nearly the full width of the roof and from just behind the windshield to a point behind the front-seat back. When closed, the panel is locked in its forward position. It may be readily released by rotating a locking handle, and the panel may then be slid toward the rear as desired. The sliding panel can be operated by one hand and may be locked in any position. There are gutters, drains, and sponge-rubber seals around the roof opening to prevent the entrance of water and air leaks.

The new Cadillac commercial line comprises three chassis, viz., Series 50 with 156½-in. wheelbase, Series 61 with 162¼-in. wheelbase, and Series 75 with 161⅜-in. wheelbase. The Series 65 has been discontinued.

Series 51 and 61 commercial chassis have the same new features as the 1939 passenger-car chassis. All frame sidebars are one-piece construction; the sidebars and X-members are of heavier stock than used in the passenger-car frames. Wider brake drums (2¼-in.) are used on the front wheels. There are special springs front and rear, six-ply tires, 18 points of body attachment, etc. The wheelbase of the LaSalle chassis is 3⅞-in. shorter than in 1938, which improves maneuverability, yet the useful chassis length is greater.

There are few changes in the Series 75 Commercial chassis, except as regards appearance features. The new 6.7 compression ratio increases the power in all gears, but ethyl gasoline or its equivalent is required. A moderate-compression engine, which will burn regular-grade fuel satisfactorily, can be had on special order.